1958

Some Factors Affecting the Teaching of Farm Mechanics in Louisiana.

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SOME FACTORS AFFECTING THE TEACHING

OF

FARM MECHANICS IN LOUISIANA

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Vocational Agricultural Education

by
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May, 1958

ACKNOWLEDGMENTS

The writer wishes to express his appreciation to the principals and teachers of vocational agriculture who cooperated in this study. The data which they supplied made this study possible.

The writer is especially grateful to the members of his committee for their constructive criticism, encouragement, and assistance during the course of this study. This committee consisted of Dr. M. C. Gaar, Dr. J. C. Floyd, Dr. Morris N. Abrams, Mr. H. J. Braud, Mr. W. H. Carter, Mr. J. B. Francioni, and Dr. George H. Deer.

Acknowledgment is also made to Mrs. Billie A. David for the typing of this study and to Mrs. Ford H. Longsdorf for special assistance.

Gratitude is herein expressed to my wife, Leola Fish Curtis, for the inspiration and encouragement during the course of this study.

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ABSTRACT

In this study an effort was made by the writer to determine some of the factors that affect the teaching of farm mechanics in departments of vocational agriculture in Louisiana. The normative-survey method of research and the questionnaire technique was used in securing data for this study. A questionnaire was directed to the 237 principals of white high schools having departments of vocational agriculture. A questionnaire was also directed to the 237 white vocational agriculture teachers. The data from the completed questionnaires returned by the principals and teachers form the basis for this study.

It was revealed by this study that the number of years teaching experience which the teachers who cooperated in this study have had ranged from one year to thirty-six years. A small percentage of the teachers are teaching farm mechanics to young and adult farmers. Twenty-four per cent of the schools represented do not have farm mechanics shops. In a large percentage of the cases the farm shops were not of adequate size and properly equipped to teach all areas of needed farm mechanics. Many of these teachers teach subjects other than agriculture. Too frequently the teachers lack sufficient training in farm mechanics, particularly in farm power and machinery and farm electricity.

It was concluded in this study that: (1) the length of time a teacher had been at one school did not affect the quality of his instructional program; (2) in the majority of the cases the enrollments in all-day, young and adult farmer classes are of a size that enables the teacher to keep shop classes within the number usually recommended;

(3) in many cases the size and equipment of the farm mechanics shops prevent the teaching of all areas of farm mechanics needed in the school community; (4) most teachers have familiarized the local administrators with the aims and purposes of the farm mechanics phase; (5) very few of the teachers and local school administrators have a long-time plan for the improvement of farm mechanics facilities; (6) the schedule followed by the majority of the schools may be a deterrent to the development of a functional and most effective farm mechanics program; (7) the teachers of agriculture lack sufficient training for teaching farm power and machinery, and farm electricity; (8) with the exception of the farm shop and carpentry phases in the total mechanical program there is an obvious lack of teacher planning and instructional organization; (9) teachers of agriculture are required to perform many other special school duties and also many of them are assigned to teach subjects other than agriculture; (10) many non-farm mechanics activities are included in the shop programs of a number of teachers of vocational agriculture; (11) in 46.7 per cent of the cases, all boys in high school must take vocational agriculture. This practice is not in accord with the basic principles of vocational education. Vocational education in agriculture should be for those who want it, need it and can profit by it. (12) Most teachers in Louisiana allot one-fourth to one-third of the total class time to farm mechanics.

CHAPTER I

INTRODUCTION

Farming is the oldest occupation of mankind. Many passages in the Bible refer to sowers of grain, keepers of vineyards, shepherds and their flocks, and tillers of the soil. From the beginning of recorded history farming shows many changes. The primary interest of man, as far as his physical well being is concerned, is securing food, clothing and shelter. This fact puts the farmer in a unique position. He is the guardian of the nutritional health of the world.

A brief look into the pages of history reveals that in the beginning, man was probably a mere gatherer of food, that is, food was gathered from plants that grew in the natural state. The population of the world increased, making it consequently more difficult to find food bearing plants to sufficiently supply everyone with food. Man discovered that many of the animals were good food. He also discovered that if he and his neighbor hunted together they were more efficient than when alone. The result of this discovery was the banding together of people for the express purpose of securing an abundant food supply. There were numerous disadvantages to this type of food collection. The primary one, of course, was that in a relatively short period of time the game supply was exhausted which necessitated the tribes moving to a new hunting ground. During this hunting period man was forced to observe closely the habits of animals. These observations led to the discovery that animals could be domesticated and thereby serve man's needs in a more satisfactory manner.

The most revolutionary phase in food provision had its beginning when man first cultivated the soil to produce crops. Man progressed,

became more civilized and began to try to provide a steady food supply. From its beginning tilling the soil has been characterized by the brute strength and heartbreaking toil necessary to eke out an existence. This fact was accepted and very little effort was made to develop methods and machines to reduce the drudgery of the farmer and his family. The hoe and other crude tools were used to till the soil. Corn was planted by hand in hills, and small grain was broadcast by hand. The sickle and the cradle were used to harvest wheat. About 1800, wooden mold-board plows were developed which were pulled by oxen or horses. About this time, some other crude machines were developed which also were pulled by horses or oxen. The steel plow and the horse-drawn reaper were invented during the 1830's, but they were not adopted widely until about the middle of the last century.

About 1900, the internal-combustion engine, commonly known as the gasoline engine, was first used to operate crude types of "traction machines", which had very limited use on a few large farms. These were gradually improved and the word "tractor" came into use. Special implements have been developed for varying conditions on farms. It is apparent that more progress has been made in the development and use of farm machinery and power equipment in the present century than in all the years since man first attempted to till the soil. Through mechanization and application of power to farming, plus increases in yields per acre and per animal from better methods of farming, America has become a land of plenty.

A recent publication from the United States Office of Education cites the following concerning Trends In Farm Mechanization:

In colonial days, 85 per cent of our people gained their living from working the soil. Today, with the consumption of farm products per capita much higher, 13.5 per cent of the people on the land produce an over-abundance of food and fiber. This increased productivity per worker is a result of farm mechanization and improved agricultural technology. Today agriculture is big business as the size of farms steadily increase. At present, there are more tractors than horses on our farms. During World War I each farm worker had an average of 5 horsepower at his command, while at present it approaches 50 horsepower. During this same period the productivity per worker has quadrupled and now an average farm worker provides food for 18.5 persons.

There has been more progress in farm mechanization during the past 25 years than during the previous 5,000. Farm mechanization is responsible for many and new improved practices. The trend toward farm mechanization is illustrated by the following charts:[1]

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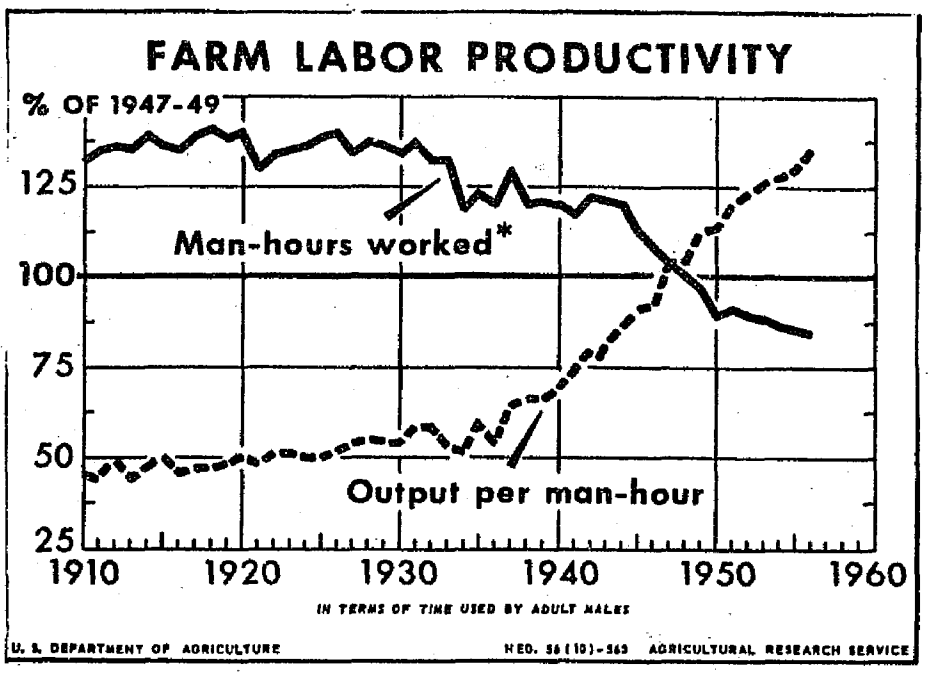
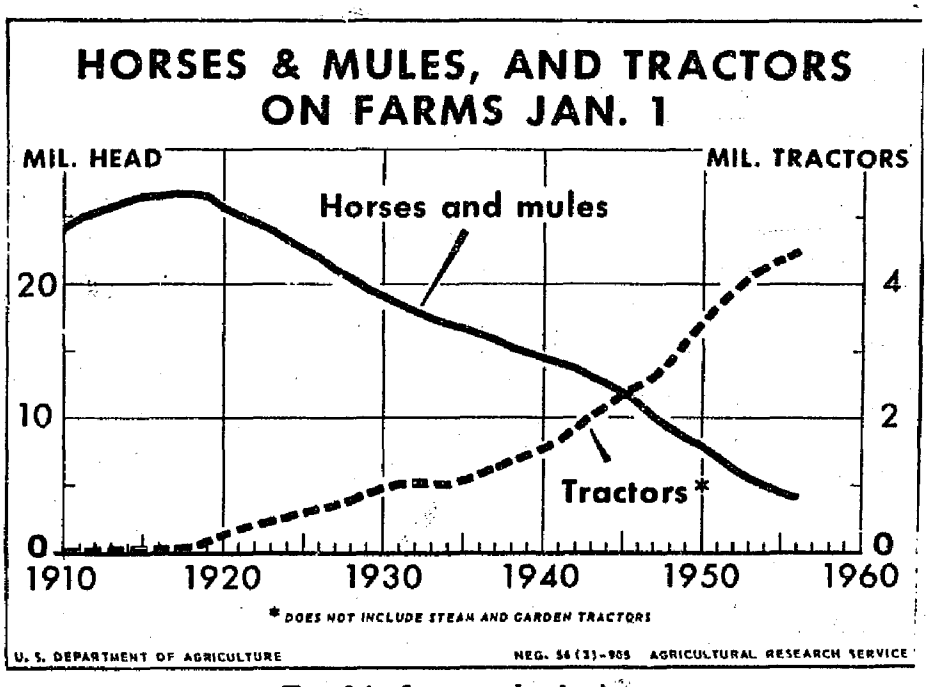
[1]A. H. Hollenberg, Instruction in Farm Mechanics, U. S. Department of Health, Education, Welfare, Vocational Division, Bulletin No. 267, (Washington: United States Government Printing Office, 1957), p. 2.



Higher productivity per man-hour helps offset high costs.



Trend in farm mechanization.

A vocation in agriculture is a specialized undertaking. The aim of education in agriculture under the Federal Acts is to train present and prospective farmers for proficiency in farming. As once said by Dean Alford Vivian of the Ohio State Agricultural College, "Vocational Agriculture is for the purpose of teaching farming and success in farming is measured by achievement on the farm."[2]

Vocational agriculture was taught in some high schools in the United States prior to the passage of Federal Aid for vocational education. A few of these schools taught farm mechanics. In the early days farm mechanics instruction was limited in scope and generally known as "farm shop work". This term is still commonly used by many teachers of agriculture. Today, this phase of instruction is called farm mechanics and included the following areas: farm power and machinery, farm buildings and other structures, farm electrification, soil and water management, and farm shop work.

Farm mechanics instruction is an integral phase of the total program of vocational agriculture. Increased farm mechanization has placed additional emphasis on this phase of instruction. Training in the five recognized areas of farm mechanics provides an excellent opportunity for each individual to further develop his farming program. Teaching of the mechanical phases of farming should be developed around the individual's problems and interest, particularly as they relate to his farming program.

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[2]Carsie Hammonds, Teaching Agriculture, (New York, New York; McGraw-Hill Book Company, Inc., 1950) p. 6.

There is little doubt that the teacher of agriculture is the individual who is in the best position and the logical one to give counsel, guidance and aid to the farmer in all areas of mechanization. If there is to be a complete and functional program of vocational agriculture in a community, modern farm mechanics must be taught to all-day, young and adult farmer classes. The farm boy, the young farmer, and the adult farmer should be trained in the knowledge, abilities, ideals, and appreciations that they need for solving the mechanical problems with which the progressive farmer of today has to deal.

A. H. Hollenberg, Specialist in Farm Mechanics, Office of Education, U. S. Department of Health, Education, and Welfare, lists the following general objectives of instruction in the Area of Farm Mechanics:

1. To develop an understanding and appreciation of the physical and mechanical aspects of farming, and the importance of farm mechanics to farming as a whole.
2. To develop abilities sufficient to assist with the more technical and less frequent problems of the farm operator which involve engineering applications.
3. To develop abilities sufficient to perform the more common and important operations or processes involving the use of tools, machinery and mechanical equipment.[3]

The supervised farming program is considered to be the heart of the entire vocational agriculture program. It follows that if the farm mechanics phase is to be functional it should be planned so that each individual will receive mechanical training and skills pertaining to

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[3]Hollenberg, Instruction in Farm Mechanics, p. 5.

the enterprises found in his program. Farm mechanics is a definite, integral part of all farm enterprises. It is the responsibility of the teacher of agriculture to assist his students to analyze each enterprise in his farming program to determine the farm mechanical activities that the student will have to do, in order to successfully and profitably carry the enterprise to completion. In addition to analyzing the various enterprises to determine the farm mechanics activities that should be accomplished, a basic skills program in the farm shop area should be formulated. Skills in the farm shop area constitute the foundation upon which much of the entire farm mechanics program can be built. Skills learned in the farm shop area, if related to the farming programs, strengthen the other four areas of farm mechanics.

Statement of the Problem. Some Factors Affecting the Teaching of Farm Mechanics in Louisiana is the title of this problem.

Farm mechanics instruction is an integral part of the total program in vocational agriculture. The increase in farm mechanization has put additional emphasis on the need for this phase of instruction. However, this important phase of our program has been slow in developing. There are perhaps many reasons why farm mechanics instruction is inadequate. The purpose of this study is to attempt to determine some of the factors that affect the development of and the teaching of farm mechanics in our vocational agriculture departments.

It is expected that the teachers of vocational agriculture and high school principals who participate in this study will become more aware of the weaknesses within their farm mechanics programs and it is

hoped will make a united effort to improve this important phase of instruction.

In this era of mechanization of farming the development of the farm mechanics phase will have much to do with the success of the vocational agriculture program and the success of the individual student toward establishment in the business of farming. With the above idea in mind, several factors affecting the teaching of farm mechanics were considered an important and timely subject in which there is immediate need for further study and research.

Delimitations. This study is limited to the farm mechanics phase of the vocational agriculture program in Louisiana high schools. It is further limited to those high schools in Louisiana which enroll white students.

Definitions. Farm mechanics is an integral phase of the program of vocational agriculture which includes all of the unspecialized mechanical activities and jobs that should be done on the farm by the farmer.

Adult farmer classes refer to men who are currently established in farming and who are receiving systematic instruction for not less than 10 two-hour meetings annually. Systematic instruction offered is planned to assist the adult farmer by developing his ability to solve his specific farming problems.

Young farmer classes are designed to meet the needs of young men who are establishing themselves in farming occupations. The instruction in these classes is so planned that it will serve youths who are out of school and who may or may not have had previous instruction in vocational agriculture.

All-day classes are those classes in vocational agriculture designed to meet the needs of students over fourteen years of age who have entered or who are preparing to enter upon the work of the farm and are regularly enrolled in high school.

Farm mechanics job is a unit in a series of operations necessary to complete a project.

Farm mechanics shop refers to a building or room within the school plant designed and equipped to hold classes in all areas of farm mechanics instruction.

Areas of farm mechanics instruction refers to farm shop, farm electrification, soil and water management, farm power and machinery, farm carpentry and buildings.

Teaching plan refers to the plan formulated by the teacher of agriculture for the teaching of farm mechanics.

Plans for Teaching Vocational Agriculture:[4]

a. Plan A--Two consecutive 60-minute periods of instruction, 5 days a week, for one year; and one 60-minute period of instruction, 5 days per week, for the other years.

b. Plan B--Two consecutive 60-minute periods of instruction, 2 days per week, and one 60-minute period, 3 days per week, for each class, each year.

c. Plan C--Two consecutive 45-minute periods of instruction per day, 5 days per week, for each class, each year.

d. Plan D--Sixty minutes of instruction per day, 5 days per week, for each class, each year, provided that there is in operation a program of systematic group instruction for out-of-school young farmers and for adult farmers for not less than a total of 72 clock hours during the year.

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[4]Federal Security Agency, Administration of Vocational Education (Revised, 1948; Bulletin No. 1, General Series No. 1; Washington: Government Printing Office, 1949), p. 39.

e. Plan E--Thirty clock hours of schedule class instruction in agriculture during each school month for each class.

Source and treatment of data. The normative survey method with the questionnaire technique was the method used in securing the data for this study.[5] A questionnaire was formulated and mailed to all white teachers of vocational agriculture in Louisiana. This questionnaire pertained to the practices used by the teachers in planning and conducting farm mechanics classes, amount of actual farm mechanics training received by each teacher on his home farm, in his high school, in college at the undergraduate level, graduate training, in-service training, farm mechanics facilities, and the farm mechanics jobs taught by each teacher last year. Also, some general information such as degree held by the teacher and length of service was included in the questionnaire.

A second questionnaire was formulated and mailed to the principal of each white high school in Louisiana having a department of vocational agriculture. This questionnaire was formulated to find out the principal's knowledge of the farm mechanics phase of the vocational agriculture program, also his observations, opinions, and practices as a local school administrator toward this phase.

There were 237 questionnaires mailed to teachers of vocational agriculture. The writer received 177 replies or 75 per cent of the total sent out.

Two hundred thirty-seven questionnaires were mailed to the principals of the 237 white high schools in Louisiana. Replies were

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[5]Questionnaire may be found in Appendix.

received from 157 principals or 66.2 per cent of the total number sent out.

The data from these questionnaires are tabulated and presented in Chapter III. The summary of the study and conclusions are presented in Chapter IV. The recommendations are presented in Chapter V.

CHAPTER II

REVIEW OF RELATED LITERATURE

Farm mechanics instruction has been included in the vocational agriculture program from its very inception. Today, more than 10,000 departments of vocational agriculture in the United States give instruction in this phase. Approximately 9,000 departments have well equipped shops.[1]

The term "farm mechanics" seems to be very confusing to some teachers and administrators alike. Some years ago the term "farm shop work" was used to designate the mechanical phase of the vocational agriculture program. With the advance in farm mechanization this term was too limited in scope. The term "farm mechanics" is now applied. Jacobs gave the following definitions of farm mechanics:

> The term "farm mechanics" as used in vocational agriculture has a very broad meaning. "Farm mechanics" and "farm shop work" are sometimes used interchangeably; however, they are not synonymous. Farm shop work is only one of the several areas of farm mechanics instruction. Farm mechanics includes all of the unspecialized mechanical activities occurring on the farm and in the farm home.[2]

In a recent publication, A. H. Hollenberg lists the following areas of farm mechanics instruction:

> Today, the farm mechanics program has been expanded to include the following areas: farm power and machinery, farm buildings and other structures, farm electrification, soil and water management, and farm shop work. Some of these areas also apply to the farm home.[3]

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[1] Hollenberg, Instruction in Farm Mechanics, p. 4.

[2] Handbook for Effective Teaching of Farm Mechanics in the Vocational Agriculture Departments of Louisiana, Bulletin No. 671, (Baton Rouge, Louisiana: State Department of Education, 1949), p. 8.

[3] Hollenberg, Instruction in Farm Mechanics, p. 4.

One of the major problems of the teachers of agriculture is keeping pace with the rapidity of change in modern agriculture. R. W. Cline of the Vocational Agriculture Education Department, University of Arizona, wrote the following article concerning keeping pace with mechanized farming.

> During a recent trip through the cotton section, I stopped to watch the oblique line of picking machines roar down the long rows and fade away in the distance. With this hugh machine each man was doing the work of approximately seventy hand-pickers.
>
> This scene is only one of the many changes on American farms resulting from large-scale mechanization. The extensive use of power equipment in farming is a rather recent development which is increasing rapidly as part of an overall trend in the application of research to problems of production. According to one authority technological progress in agriculture during the past decade is three times that of industry. Although the expenditure of funds for research in agriculture has not kept pace with that in other kinds of industry, we may expect substantial gains in future years. Agriculture will also benefit directly and indirectly from some types of research conducted by business and industry. When the full impact is felt from the vast programs of research and technological development now in progress, there will be even greater improvement in farm equipment and practices. These trends have important implications for programs of instruction in farm mechanics. It is appropriate here to mention only a few items with the hope that they may stimulate further analysis of this important phase of vocational agriculture.
>
> Since the quality of instruction is determined by the teacher, the selection and preparation of instructors is a matter of first importance. Due to an increasing number of multiple teacher departments some specialization is now possible in teacher responsibilities with corresponding selection and preparation of personnel. In general there appear to be two major needs in the pre-service training program; first, the expansion of learning experiences adequately to cover the five basic areas of content; and second, the teaching of abilities on the doing level with emphasis on the mechanical jobs most commonly performed by farmers. The in-service training program should emphasize cooperative courses, clinics, and workshops between the training agencies and the equipment industry, with extensive use of specialists as consultants and instructors. Such working relationships will aid teachers in keeping their facilities and practices abrest of new developments.

> In determining course content, teaching procedures and shop facilities, major consideration should be given to the efficient use of the individual's time as a student in school and a producer on the job. Unless the jobs and practices taught in the shop are feasible from the standpoint of time requirements and other economic considerations they may have little value in the present highly competitive system of farming. While vocational agriculture is increasing in scope, class time is on the decrease. This emphasizes the need for completely equipped shops with adequate power tools, improved shop organization, visual aids and the direct demonstration-participation approach to speed up the learning process. The practice of purchasing or leasing farm machinery for class use enables the instructor to teach on the doing level and to set good standards of workmanship and habits of safety.
>
> Along with improved facilities comes a responsibility to make greater use of this expensive part of the school plant. A logical development in this direction is the expansion of instructional programs for young and adult farmers. The improved facilities may also serve the needs of vocational agriculture students who will enter jobs related to farming. From the classrooms and shops of able teachers will come many leaders for this age of mechanized farming. Herein lies a challenge for the present, an inspiration for the future.[4]

T. G. Walters discusses the need for farm mechanics instruction in the vocational agriculture programs at length in an article written in The Agricultural Education Magazine. His remarks are as follows:

> No one likely will challenge the statement that the need for mechanical skills, and managerial abilities in this day of modern farming requires more schooling for those who have chosen farming as their way of life.
>
> As an example of this need, according to a reliable source the average value in 1950 of farms producing at least $2,500 worth of products was $26,500. It requires more than the three R's for a farmer to manage successfully a business of this size.
>
> Developing these everyday skills and abilities of working people is the objective and the task of vocational agriculture.

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[4] R. W. Cline, "Keeping Pace With Mechanized Farming," The Agricultural Education Magazine, XXVIII (January 1956), 147

The significance of education for farm people is obvious in view of the decreasing role of hand labor in agriculture and the increasing need for mechanical skills and managerial ability.

Amazing changes have taken place in our generation. We live not only in a unique time in history but also in a unique spot on the globe. If we review the progress man has made in scientific and technological changes, starting with the story of creation in the book of Genesis and continuing until 1854 - 100 years ago, we will find that practically no changes were made. The farmer in 1854 farmed with practically the same information as primitive man. Most of the changes have occurred since the turn of the present century. And most of us in the field of vocational education have had a part in this amazing scientific revolution.

Where does the farmer find himself in this scientific age? Many of our farmers grew up at a time when a grammar school training was all that was considered necessary in farming. That day has passed. Today, a farmer needs to be trained for his job just as does a doctor or lawyer.

A good picture of the need among Georgians for vocational training, to illustrate with a particular state, may be gained by studying the history of the class which graduated from the state's high schools in 1954, looking at it periodically from the time it started out in the first grade in 1943.

Year	Grade	No. of Students
1943	First	145,675
1946	Fourth	79,433
1949	Seventh	59,991
1952	Tenth	37,338
1954	Graduated	22,880*

*Only about 5,500 of these have entered Georgia colleges.

These figures show that only 16 per cent of those who entered the first grade in 1943 actually continued in school until they were graduated in 1954. More than 108,000 or about 64 per cent of the original class didn't get far enough in school to be benefited by vocational education.

The above case clearly illustrates that vocational education has a real challenge to provide training for the masses who do not have the opportunity to go to college and especially for those who have dropped out of school before completing high school. And many of our farm people did not have the opportunity to stay in school beyond the grammar school level. Someone has said that "vocational education is the working man's college".

In order for vocational agriculture teachers to do a better job in giving instruction to out-of-school groups in farm mechanics, there are several criteria which must be met. We must realize that farmers today have a better opportunity to secure information than ever before. Many farmers do not want information on varieties and fertilization but are interested in new information such as insecticides, government programs affecting their farm operations, new feeding practices with some of the latest developments of hormones in feeding beef cattle.

Farmers have, almost over-night, changed over to a "machine age" in agriculture. It has been estimated that 95% of the productive work done in America is done by machine. Truly this is a "machine age".

Vocational education must adjust its program to meet the challenge before us. We must give our farmers the kind of training they want. Agriculture has changed so rapidly in the last 15 or 20 years that it has been almost necessary to retrain all teachers of vocational agriculture.

In Georgia, we are attempting to give in-service training to our teachers and to see that they have the technical "know-how" to conduct adult classes in farm mechanics. For the past two summers, we have had a staff of people from the College of Agriculture, consisting of agricultural engineers and teacher trainers, working with teachers in the field by conducting workshops in rural electrification and tractor maintenance. We have reached practically all of our teachers in these two clinics which were set up on a "learn by doing" basis. In the electrical courses panels were constructed and each teacher was given an opportunity to do wiring. Before the end of the two-day course, the instructor checked the work of each teacher. The same was true in tractor maintenance courses. Tractors were brought into the central school, and all teachers had an opportunity to put into practice what the teacher taught. We are confident that we have made progress in our adult program in these two areas.

In some of the other areas farmers want help in building fences, farm electrification, farm water supply, and irrigation. I do not mean to imply that we must move out of the area of farm planning which would include the proper use of our land, fertilization, varieties, insecticides, etc. These are all important.

We have a big job to do, and I go back to one of my original statements in saying--our teachers must have an opportunity to be kept up-to-date on what's new in agriculture as well as know how to put into practice many of the skills which are essential in the farmer's profession. It brings to

> my mind a statement made by a Negro "master teacher" when he said, "You can't teach what you don't know. You can't lead where you won't go."[5]

Farm mechanics should be an integral part of the vocational agriculture program. Farm mechanics instruction to be most effective must be closely coordinated with the productive enterprises being taught. The various supervised farming programs should be carefully analyzed when outlining the farm mechanics teaching program. Dr. W. T. Spanton has this to say concerning the coordination of farm mechanics instruction with productive enterprises:

> Teaching farm mechanics in terms of agriculture, rather than as general or diversified shop activities, is a growing trend in vocational agriculture.
>
> Using this system, teachers develop a close coordination between instruction in farm mechanics and the various productive enterprises being taught.
>
> For example, during a period when the subject of teaching is dairying, instruction is given in the production of feed and pasture crops, housing, and other phases of dairy husbandry and management. At the same time, farm mechanics instruction features care, repair, and maintenance of milking equipment, ensilage cutters, and other machinery used primarily in support of the dairy enterprise.
>
> CORRELATION OF ENTERPRISES
>
> When instruction is given in swine production, there will be farm mechanics activity in such areas as construction of feeders, automatic watering devices, pig brooders, and other swine equipment. Discussion of home-ground feeds in rations calls for instruction in the care and use of grinders and mixers.
>
> Farm mechanics instruction can be correlated with other phases of instruction as well. There will, of course, be some kinds of machinery, and equipment that is typical of most farms and most kinds of farming. Instruction in the care and operation of tractors, for example, could be correlated with any of several productive enterprises. The existence of such general machinery and equipment lends flexibility to the system of teaching, since those items can be fitted into the instruction program at times when there might be few, if any, specialized machines to be studied.

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[5] T. G. Walters, "The Need Is Great," The Agricultural Education Magazine, XXVIII (January 1956), 147

During the early days of the vocational agriculture program, most of the instruction in farm mechanics was limited in scope and was generally known as "farm shop work". The instruction was largely of a diversified shop character, and confined to such manipulative skills as could be taught in a rather small, usually ill-equipped, "school shop". Most of the time was devoted to jobs in woodworking, forging, leather work, and rope work.

TEACH MACHINERY SELECTION

Some teaching of manipulative skills is still required, but most good teachers now place the major emphasis of their farm mechanics instruction on the operation, care, minor repair, and adjustment of machinery and equipment.

With the increased mechanization of agriculture during recent years, and with the development of many specialized machines, teaching is required now on the selection of machinery and equipment. Instruction in this field is particularly fitted to correlation with the teaching of productive enterprises.

Increased mechanization also adds importance to the teaching of safety practices in farm mechanics. Vocational agriculture teachers have been doing particularly outstanding work in the teaching of safety.[6]

Everett C. Lattimer states that if a farmer is to be successful he must know how to perform a wide number of operative skills dealing with soils, crops, animals, chemicals, tools, equipment and machines. He further points out that these skills are often interrelated so that to perform a single farm job calls for not only manipulating a machine but to do it with relation to the soil it is on, the growing crop, the safety of the operator and the life of the machine he is using. Just performing the job is not enough. He should meet desirable standards of efficiency.[7]

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[6]W. T. Spanton, "Teaching Farm Mechanics for Farming", County Agent Vo-Ag Teacher, (August 1955), 33.

[7]Everett C. Lattimer, "Pupil Farming Programs", The Agricultural Education Magazine, XXVIII (March 1956), 195.

The importance of the mechanical phase of farming is emphasized by Mack M. Jones in the following statement:

> The American farmer is an unspecialized mechanic. In growing crops, raising animals, and marketing the products of his toil, many mechanical jobs are encountered. Such jobs must be done in order to accomplish his primary purpose. Along with these responsibilities is that of maintaining an efficient, satisfying home and surroundings. All this involves planning and some degree of mechanical skill; otherwise, the necessary repair, replacement, reconditioning, and construction work, of many types and kinds, cannot be taken care of properly.[8]

The primary aim of vocational education in agriculture is to train present and prospective farmers for proficiency in farming. Cook, Scranton, and McColly make the following comments on the primary aim of vocational education in agriculture:

> Vocational education in agriculture has for its primary aim; "To train present and prospective farmers for proficiency in farming". Proficiency in farming necessarily includes considerable ability to work with tools and equipment. Any comprehensive plan for farmer training must provide opportunity for the development of such abilities involving the use of mechanics that are essential to successful farm management and operation.
>
> Among the contributing objectives of vocational education in agriculture, the two following items indicate the general nature and emphasis upon this phase of the training program:
>
> > "To select and purchase suitable farm equipment and supplies
> > To perform appropriate economical farm-mechanics activities."[9]

Cook, Scranton, and McColly further state:

> The farm mechanics instruction should be closely related to the student's farming program, including productive and improvement projects and supplementary farm jobs.[10]

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[8] Mack M. Jones, Shopwork on the Farm, (New York and London: McGraw-Hill Book Co., Inc., 1945), p. 1.

[9] Cook, Scranton and McColly, Farm Mechanics Text and Handbook, (Danville, Illinois: The Interstate, 1946), p. 1.

[10] Ibid., p. 33.

The writer has heard many comments of concern over the practicality of the farm mechanics program as it is conducted in many schools. There is little doubt that farmer training in farm mechanics must be of a practical nature and usable in the farmer's operation. Butler gives attention to the practical side of farm mechanics in the following paragraph:

> Farm mechanics should not be a conglomeration of hit or miss practices. Skills should be developed and advanced in a manner that they will be both challenging and beneficial. They must meet the needs and stir the interests of the boys. These skills must be held within the realm of a boy's ability for a better understanding. Too many times the teacher believes a series of type jobs is sufficient. This leaves the pupil without any practical application or worth-while project and fails to promote the needed interest. The ability of the pupil to make the transition from practice to the practical projects often requires instruction which was not given in a practice or type job. There should be practical practice and application of skills in a well planned farm mechanics program. The quality of the skills should compare favorably with that developed in the trades instead of resorting to halfway methods. All of this should lead to efficient utilization of the farmstead facilities and equipment.[11]

Ernest L. DeAlton wrote the following article on objectives in farm mechanics:

> The question, "What should be our objectives in a course in farm mechanics?" caused considerable thought and discussion recently among a group of prospective teachers at the North Dakota Agricultural College. The final thought, however, was that to be effective the course should aim at more than developing certain manipulative skills, the inclusion of a given number of projects, or the turning out of a large amount of shop work. Instead, the group felt that for the course to be effective it should develop the student's ability to do good thinking, that it should aim to help the boys to become more efficient farmers by developing proficiency in (1) the selection, operation, care, and repair of farm machinery and equipment necessary in modern farming, and (2) doing the ordinary repair and construction jobs that could and should be done by the farmers in their communities.

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[11] Ted A. Butler, "Emphasize the Practical," The Agricultural Education Magazine, XXVIII (January 1956), 155.

With this thought in mind, the group then outlined some definite interests, ideals, appreciations, and abilities they felt should be developed in the course. These were as follows:

INTERESTS

1. In a job well done.
2. In establishing a good home farm shop.
3. In labor-saving devices.
4. In having a well-kept farm.
5. In new developments in farm equipment.
6. In farm mechanics literature.
7. In keeping farm equipment in good condition.

IDEALS

1. A place for everything and everything in its place.
2. A desire to make the best use of time.
3. A desire to be a good thinker and organizer.
4. A desire to own good tools and equipment.
5. A desire to be satisfied with only the best the individual can do.
6. A desire for a convenient, well-kept farmstead.
7. A desire for fair play.

APPRECIATIONS

1. Of the value of time, material, and money.
2. Of the value of standard tools and equipment.
3. Of the value of a well-kept farm shop.
4. Of good workmanship.
5. Of the value of co-operation.
6. Of the value of labor-saving devices.
7. Of the value of doing a job when it should be done.
8. Of carrying the job thru to completion.
9. Of honesty and fair play.

ABILITIES

1. To use farm-shop tools properly.
2. To organize one's work efficiently.
3. To decide when to hire skilled workers.
4. To determine when a job is well done.
5. To read common blueprints and drawings.
6. To select and use farm tools and equipment wisely.
7. To do clear thinking.
8. To co-operate with and appreciate the other fellow.
9. To realize and correct one's shortcomings.
10. To determine what equipment to buy.
11. To estimate a bill of material and order it properly.
12. To keep tools in proper working condition.

13. To plan and make improvements for the farm home.
14. To do common repair and construction work on the farm.[12]

What are the educational values in farm mechanics? This is a question asked many times concerning our program. G. W. Busing, Teacher, Leaf River, Illinois, gives this reply in an article written for the Agricultural Education Magazine:

> Effective instruction in farm mechanics carries many educational values expressed in terms of acquired or changed habits, skills, knowledges, or attitudes. Kilpatrick has said, "When we consider the kind of school demanded three things stand out. First, it must be a school of life, of actual experiencing--no other one could furnish the needed learning conditions. Second, it must be a place where pupils are active, where pupil enterprises form the typical procedure, for purposeful activity are the typical units of the worthy life wherever lived. And, third, an interested and purposeful teacher."
>
> Farm mechanics contributes greatly to the first two points in the kind of school we need. There is no doubt that when a farm boy plans and constructs an individual hog house a good deal of fore-thought is required; that he is putting into practice a few of the fundamentals and details in construction. He studies many plans. He actually looks around while he is riding to school, or while he is driving to the city to get a number of ideas or patterns for the construction of his house. He settles in his mind whether it shall have a floor in it or not. He decides whether it shall have a single-slope roof, or if it is to be "A" shaped. He figures lumber bills, decides whether he is going to use shiplap or drop-siding, determines whether he should use soft pine or fir, and determines how much it is going to cost and how long it is going to last. He finally selects a paint, and then comes the biggest job, construction. This is a school of actual experiencing; it is a place where activity is promoted, where pupil enterprises form the basis for purposeful activity.[13]

Instruction in farm mechanics should contribute to the primary aim of vocational education in agriculture. In keeping with this aim our purpose in teaching the mechanical phase of farming must be to

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[12]Ernest L. DeAlton, "Our Objectives in Farm Mechanics", The Agricultural Education Magazine, XII (May 1940), 211.

[13]G. W. Busing, "Finding Educational Values in Farm Mechanics", The Agricultural Education Magazine, XII (March 1940), pp. 172-173.

assist present and prospective farmers to become more successful.

Hollenberg offered the following comment on purpose.

> The purpose in teaching farm mechanics in our high schools is to develop better citizens and more successful farmers. A boy may become a fine mechanic and still be far from the kind of farmer who can run a farm at a profit. When the course in farm mechanics is so arranged that we are teaching the principles and skills that have to do with the agricultural enterprises found in the communities where the subject is being taught, we will at least be nearing the goal for which we are striving. We must keep in mind that the majority of the boys whom we are instructing are going back to the farm. Too often we teach unrelated industrial skills, as if we were educating a man who is to set up a shop in town for farm repair work.[14]

Some additional observations on purposes in farm mechanics were made by C. S. Hutchison:

> The purpose of mechanical instruction is more than merely to develop skill, to impart a knowledge of tool processes and of materials, or to construct and repair articles that have an economic value. This course, like any other which has a place in the high school curriculum, should stimulate reflective thinking on the part of the student and aid him in developing proper attitudes. On account of the natural interest which many boys have in working with tools, it is entirely possible to keep a group busy making things in shop without really learning through problem solving. The shop teacher should realize that technical preparation on his part, even though it be very thorough, is only part of the foundation for successful shop and engineering teaching. The presentation of the work must be carefully planned, so that the students will be working with a definite purpose. Provision must be made for testing the result of each student's work, so that both he and the teacher may know the degree of his accomplishment. Further provision must be made to balance the course so that each student performs a wide variety of jobs, giving him a corresponding range of shop experiences.
>
> Instead of setting aside a certain portion of the school year to be devoted to farm carpentry, another portion to harness repairing, another to soldering, etc., the teacher should, in planning the course, prepare a list of jobs which will involve the development of the desired skills, the acquisition of the

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[14] A. H. Hollenberg, "Mechanics for Farmers in a Machine Age," The Agricultural Education Magazine, XII (June 1940), 234.

> related information, the solving of the necessary problems, and indirectly through the variety of experiences, the development of the proper attitudes. From this list, selections should be made with regard to the ability of the student at the given stage of instruction and progressively increasing in difficulty and teaching value. The jobs must not be set up as "exercises" to be performed. The normal boy is not interested in doing things for which he sees no purpose. Fortunately there is a better means of teaching mechanical activities than the "exercise" one. The project method of shop teaching holds the interest of the student, and at the same time affords a maximum of teaching value.
>
> The project method allows each boy to work on articles in construction or repair work, adapted to his skill in the use of tools and to his individual interests. It also offers a ready solution of the problem of adjusting the work to home interests where farm boys and village boys are enrolled in the same class. The use of the project method, adapted to the boy's home interests, will necessitate a knowledge of such interests on the part of the instructor. This involves contact with the boy's home conditions through personal visitation whenever possible. The project method secures the student's interest by offering opportunity for individual planning. Since there is frequently more than one desirable method of constructing or repairing an article, alternative methods must be weighed, decisions made, and plans executed, all involving the exercise of judgment by the student. This is in marked contrast to merely following directions in exercises in which the student has little interest because there is little freedom of action.[15]

To be effective, a program of vocational agriculture must be built around the farming needs of the community it serves. Farm mechanics instruction as an integral part of the program must also serve the farming needs of those enrolled. Attention is given to the consideration of needs in the farm mechanics program in the following paragraphs:

> Vocational teaching implies that instruction is based on the felt needs of the student. Teaching on the theory that "you will need this some day" is not effective, and the pupil soon forgets. At best his learning becomes pure memorization and he will not be able to apply it to new situations as they appear upon his farm. In addition, pupils may develop

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[15] C. S. Hutchison, Farm Shop and Agricultural Engineering, (Ohio State University, Columbus, Ohio, 1936) pp. 7-8.

undesirable attitudes when given class instruction for which there is no felt need.

Instruction in farm shop should, therefore, be based upon activities growing out of recognized needs of the pupils and the community. Each boy should be led to feel the need for the work he is to undertake. The instructor should know the jobs the boys should find most valuable as a result of definite farm needs, and should lead them to a recognition of these needs and a desire to meet them.

Leadership by the instructor in this respect is very important. It is not enough to ask, "What are the jobs that should be done on your farm?" It is necessary also for the instructor to recognize the jobs to be accomplished and through discussions, conferences, field trips, reference readings, and other means to lead the boys to a discovery of the important jobs on their farms.[16]

Another interesting discussion of needs in farm mechanics teaching is presented in a bulletin issued by the Illinois Board for Vocational Education:

The importance of farm mechanics is appreciated even by those who consider farm mechanics as a non-productive phase of agriculture. Regardless of how farm mechanics is considered it probably is true that modern agriculture as we know it in Illinois is almost as dependent upon what might be called farm mechanics as it is upon a productive soil. A good farm mechanics program not only contributes to, but is essential for, effective and economical production as we know it at the present time.

Farm mechanics programs which best meet the needs of those in local communities are those that give consideration to the needs of evening school and part-time groups as well as to the needs of all-day students and are programs that are not limited to manipulative farm shop skills. Farm mechanics may be even more valuable to part-time and evening school groups than it is to all-day students. Too many programs have been and continue to be handicapped because of undue emphasis on manipulative shop skills such as soldering, rope work, harness work, saw filing, and the like. Such skills are now relatively unimportant on many Illinois farms, and the field of farm mechanics offers unusual opportunity for the selection of more valuable units of work.

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[16]The State Board of Control for Vocational Education, Farm Shop Work in Michigan Vocational Agriculture Departments, (Bulletin No. 261, Lansing, Michigan, 1940) p. 18.

> Some idea as to the possible scope of a farm mechanics program may be obtained from a report of a committee of the American Society of Agricultural Engineers. After a study of the problem this committee set up five areas in which training should be given; namely (1) Farm Shop Work, (2) Farm Power and Machinery, (3) Farm Building and Conveniences, (4) Soil and Water Management, and (5) Rural Electrification.
>
> Farm mechanics, like any other part of the Vocational Agriculture program, should be justified on the basis of its meeting the needs of those in the community. The horse and buggy may have met many of the transportation needs of 35 years ago, but few would now argue its adequacy for the present. The bar or stable has given way to the garage. Likewise, the ideas of the adequacy of a vocational agriculture program with no farm mechanics or of a 20' by 30' farm shop must give way if the needs of those in the community are to be met. Fully as important changes have occurred within the last 35 years in the field of transportation. Such facts should not be overlooked when planning the building and the course for farm mechanics. THE UNHEARD OF YESTERDAY MAY BE A NECESSITY TODAY.[17]

In the opinion of most, if not all, leaders in vocational agricultural education, there is no substitute for the farm survey in determining course content. A. D. Longhouse very ably presents the following comments on using a survey to determine course content in farm mechanics:

> Every program in farm mechanics should be based on the needs of the boys in the classes. The only way of determining these needs is to survey their home situations, and first of all determine the needs of these boys in their supervised practice programs. The program of farm mechanics must be correlated with the rest of the activities in the department and with each boy's supervised practice program. A summary of the survey will usually bring out many factors or conditions which even the teacher with long service in the community was not aware of at the time. Needless to say, the beginning teacher or an experienced teacher moving into a new community can profit materially by surveying his school area.

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[17] Illinois Board for Vocational Education, Farm Mechanics in the Program of Vocational Agriculture, (Bulletin No. 111, Springfield, 1949) p. 7.

> Today the farm boy must become mechanically minded, and sufficiently skilled in mechanics so as to repair his farm machinery and buildings and to continually strive to improve the home surroundings. In order to do all this he must have a place to work and sufficient tools with which to work.
>
> With the above points in mind let us take stock of what we would want to include in a survey. First of all, we want to know about the status, or present conditions in the home and on the farm. Is it served by electricity? Does it have running water and an adequate sewage disposal system? Do the buildings need painting? Is there a home-farm shop, and is the farm machinery kept under cover when not in use? Many more questions might be asked and all of them should be brought out in the survey which may be divided into four parts: the home situation, farm machinery and equipment, shop tools and supplies, and the home-farm shop.[18]

A. C. Kennedy presented these additional comments on using a survey to determine needs in farm mechanics in an article written for The Agricultural Education Magazine:

> The organization of a successful farm-shop course should be based on the needs of those taking the course. These needs must be determined early and should be obtained from those enrolled in the course. As a background for this organization, the teacher should visit the home farms of the members of the class and secure survey data on certain existing conditions thru observation and by talking with the boy and his father.
>
> In obtaining information from the members of the class, the first consideration should be the boy's individual farming program. Just what jobs will he need to be able to do in order to provide the articles needed in conducting successful productive projects? For example, a boy who has 100 laying hens for his project in animal husbandry will need to be able to do repair and construction work on his house and equipment. It is the job of the boy and the teacher in this case to find out what repair and construction work is needed. It may be that he is taking over the home flock and will want to cull them before housing for the winter. This presents the need of a catching crate. He may want to build some mash-feeders, waterers, or a nest rack, or to improve the roosts. It may be some of the glass in the windows is broken and needs to be replaced, or there may be a leak in the roof that needs to be repaired.[19]

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[18] D. A. Longhouse, "Using a Survey in Determing Course Content in Farm Mechanics", The Agricultural Education Magazine, XIII (April, 1941) p. 187.

[19] A. C. Kennedy, "Determining Content for Farm Shop", The Agricultural Education Magazine, II (August 1938) p. 32

It is quite definite that if teaching is to be effective the teacher must plan well. In farm mechanics instruction the planning factor must be considered more closely than in other types of teaching. More definite planning is necessary because as a usual rule several operations are underway at one time. The August, 1949, Agricultural Education Magazine published the following article on planning farm mechanics instruction:

> Many students have failed to learn because the teacher has failed to plan.
>
> In order to teach farm mechanics with maximum proficiency, the instructor must plan well. The plans for a program in farm mechanics can be compared to the plans made by an architect before construction of a house. Before a plan is drawn up the architect makes a careful study of the many features that will go into making the house suitable for the people who are to use it. So it is with planning a farm mechanics program. The teacher of vocational agriculture has to study the factors that go to make a worthwhile program and then draw up a "blue print" to guide him in conducting this program which, if carried out, will give him the kind of product he desires.[20]

Equally important and indeed a part of planning is shop organization. This factor seems to give most teachers more trouble in teaching farm mechanics than any other one thing. Many teachers complain that they have tried many things, but have yet to find a method of organization that works. Mr. Carl G. Howard presents the following tips on shop organization:

> The success of a farm-mechanics teacher is determined to a very large degree by his ability as an organizer. In all probability more articles have appeared in print emphasizing shop organization than have appeared with any other emphasis. It is generally conceded that the measure of a teacher's success in the shop is in direct proportion to the amount of organizing and planning which he does in advance of the time when the actual operations in the shop occur.

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[20] P. A. Norris, "Planning Farm Mechanics Instruction", The Agricultural Education Magazine, XXII (August 1949), 37.

An analysis of the steps which must be gone thru in the actual organizing of a course in farm mechanics presents a list of topics on each of which a whole volume might be written.

The first step in the actual setting up of a course of study is the determination of objectives. These objectives to be effective should be divided into long-time and immediate classification. The long-time objectives apply to the acquisition of skill, knowledge, and ability in the various enterprises comprising the course of study. This again seems to be a generally accepted fact.

The actual distribution of time is about the next point to which attention must be given. Unless this point is planned in detail, the teacher is likely to wake up sometime in the spring with the knowledge that the year is nearly over and that there are many things he had intended to accomplish in the shop which will now be impossible due to a lack of time. The different schools in the different sections of the country offer such variation in time allotments to farm mechanics that each teacher has a time situation of his own. However, there are a few such distributions which may be considered as means. The table shows a seven and one-half hour week time distribution on a clock hour basis whereby the two-year course uses 80 per cent of the junior-senior years, and the four-year course uses 40 per cent of the whole four years in high school. The important features of this distribution are not that anyone will ever adhere to them exactly, but that they will serve as a yardstick for all boys. The hours and percentages are entirely arbitrary, and each teacher should adjust them to his own ideas of importance of the various enterprises.[21]

A bulletin from Virginia Polytechnic Institute has this to say concerning organizing the farm mechanics class:

It is needless to say that good teaching depends to a large degree on the proper organization of the class. This is especially true in farm shop work. After the content of the course has been determined, the organization of the class may be effected by a method very similar to that used in organizing a class in individual instruction. Even though the shop class is small, with the recommended number of 10 to 12 students in it, very seldom, if ever, will they all be working on the same type of work at the same time. Few shops have sufficient tools to

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[21] Carl G. Howard, "Checking the Farm Mechanics Organization," The Agricultural Education Magazine, II (August 1938), 33.

permit such a procedure. This situation will necessitate grouping the students according to the type of work they will be doing.[22]

The University of Wisconsin offers the following suggestions in planning and organizing a unit on farm machinery instruction:

> As a teacher of vocational agriculture, you are cognizant of the current and anticipated changes in farm mechanization which have implications for curriculums and learning experiences for each student in this area. Similarly, you certainly are aware that agriculture is no longer a relic of the "horse and buggy" days. For example, tractors in the United States increased from 1.5 million in 1940 to 4.6 million in 1954, representing an almost 200 per cent increase. Farm trucks increased from approximately 1 million to 2.7 million; miling machines from 175 thousand to 730 thousand; or more than 300 per cent increase; combines from 190 thousand to 950 thousand; and mechanical corn pickers from 110 thousand to 640 thousand. Comparative advances have been made in various areas of agriculture.
>
> What do these changes mean in terms of instructional responsibilities to present and prospective farmers in the area of farm power and machinery? Certainly these changes mean: (1) that vocational instruction in farm machinery must be "geared" to problems associated with the present and prospective farmers in this area, (2) that teachers must plan continuously for anticipated needs in this area, (3) that teachers must continue to inform themselves through various professional improvement means so that technically correct and sound instruction might be provided, (4) that basic farm machinery instruction must be integrated into educational programs for farm people, (5) that present and prospective farmers be taught an appreciation for proper care, adjustment and maintenance of their investments, and (6) that teachers should provide good learning experiences for every student through a "learning by doing" program.
>
> Why Plan for a Farm Machinery Unit
>
> There are a number of basic reasons why a farm machinery unit should be included in vocational agriculture instruction. One very valid reason is depicted in a statement recently made by an experienced instructor, when he said, "What these boys are learning and doing here can't be measured in dollars and cents." He was referring to the fact that "each of his students

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[22]Virginia Polytechnic Institute, Some Aids in Teaching Farm Shop (Blacksburg, Virginia, 1941), p. 47.

was changing and improving himself as he learned and experienced changes and improvement in machinery and equipment from his home farm." This implied "personal development of individuals--learning by doing, seeing results, developing pride in workmanship, being motivated by seeing and sensing personal accomplishment--has an unmeasurable educational value".

From a practical viewpoint, there is not basis reason for neglecting instruction in repair, maintenance and adjustment of farm machinery normally performed personally by farmers. This is true for some very understandable reasons: (1) Economy is involved in the farmer performing certain operations himself, (2) Utility is involved since the farmer is concerned with achieving maximum operational efficiency, reduction in breakdowns, loss of time and over-all farming efficiency, (3) Convenience is involved since having the ability to do-it-yourself makes the farmer less dependent on others at strategic periods of farm operations. These are only some of the factors emphasizing the importance of this instructional phase of vocational agriculture.

Assuming that teachers recognize the importance of good sound instruction regarding farm machinery, how might a teacher get a high degree of student participation--thus student learning--in this unit? What are some ways of getting worthwhile machinery projects into the local vocational agriculture department?

A Program in Action

To illustrate that a high level of student participation and learning can be achieved, the author would like to relate some recent observations made in the Richland Center, Wisconsin, Department of Vocational Agriculture. It was discovered that 34 students were enrolled in Agriculture III (this is a multiple-teacher department). Leo Keegan, who is one of the two instructors and who has taught for 17 years in the department, was supervising the students in their farm machinery unit. Thirty-three of the thirty-four students were busily and interestingly engaged in repairing, adjusting, replacing worn and broken parts and painting various pieces of farm machinery from their home farms. This machinery included:

Item	Number
Harrows	14
Discs	5
Tractors	3
Spring Tooths	3
Manure Spreaders	3
Mowers	2

Lime Spreaders	1
Wagon	1
Side Delivery Rake	1
Total	33

This type of program reflected effective planning and preparation for the farm machinery unit. These students, learning the use of various shop tools and equipment in completely repairing and finishing their farm machinery, were thoroughly enjoying their experiences.

A logical question, following this highly successful program, is how a teacher might get high level participation and learning experiences by getting worth-while projects on which to work. The following ideas are some expressed by this teacher and other persons who have taught successfully in the area of farm machinery.

Getting Worth-While Projects

It is recognized that instruction will purposely occur with groups and with individuals in the area of farm machinery. There are times at which an instructor will necessarily and desirably be providing demonstrational teaching to a group.

Here are a few recognized ways for providing machinery for group teaching:

1. Local farmers cooperate in supplying machinery.

2. Local machinery dealers might cooperate if they are contacted and the program explained thoroughly.

3. Individual students volunteer to bring equipment and machinery to the location where instruction is to be given.

4. Arrange ~~to take~~ the group to a specific farm (s) for teaching and demonstrations.

5. Use school or departmentally owned equipment and machinery for teaching purposes.

6. Purchase used machines and equipment at farm auctions, etc., to use for group teaching to illustrate principles of proper maintenance and care, methods of repairing, adjusting and finishing machinery. Such reconditioned machinery might be sold as a Chapter or departmental project to finance other such purchases or be used for exhibitional purposes to promote this phase of the program.

Effective teaching in farm machinery is not fully accomplished until students have been involved in "learning by doing." This

necessitates their having machinery and equipment with which to do something. How then can a teacher of vocational agriculture get machinery and equipment into the local department so that students will learn first-hand how to repair, maintain and care for it?

There are several ways and means to accomplish this. No one approach is necessarily entirely effective, but here are some additional ways which, it is hoped, might contribute to greater over-all effectiveness:

1. Plan for the farm machinery unit well in advance of the time to be devoted to it.

2. Build a reputation that you are a planner--that necessary teaching supplies, materials and machinery are on hand when instruction and work experiences in the unit begin.

3. Help each student study and analyze his machines and teach how to identify needed repairs, etc., of machinery and equipment necessary in: (a) His supervised farming program, (b) His home farm business, (c) Farms in community (in case of placement students).

4. Have class survey a representative farm in the community, identifying needs for repairs, maintenance and care of farm machinery and equipment. Follow this by encouraging similar individual surveys by class members on their own farms. Help might be given in the latter case by diplomatically identifying needs during a functional farm visit.

5. Visit each student as frequently as possible, calling special attention to the individual's opportunity to learn to repair, adjust and maintain machinery (be sure to inform students of the time they will definitely have this opportunity).

6. Never forget parents, especially the father; let him help plan learning experiences with his son and you. Some parents must "see to believe" that their sons can perform at a high level--this means that you must help see that this is a reality.

7. Reward the student who seriously plans, selects and completes a good farm machinery project. This might be done through personal praise, evaluation marks, recognition at open houses, parent nights, banquets, etc.

8. Plan open houses and exhibits--invite parents, school administrators, key persons, advisory members to observe program and progess of activities:

   (a) Give students "active responsibility" in planning such events with you.

(b) Exhibit good projects completed.

(c) Provide information tags for each machine, giving such information as: (1) Parts replaced, adjusted; other work completed. (2) Estimated value increase as result of learning experiences of the student. (3) Costs of repairs, parts, painting, etc. (4) Student completing projects. (5) Workmanship evidenced.

9. Encourage students to select functional projects--one which provide learning experiences and also meet an immediate need for the individuals, being sure to allow student choice in selection of machinery and equipment.

10. Show machinery undergoing study and repair to other students to create an interest in the area (this is especially true for beginning students in vocational agriculture).

11. Publicize learning experiences and activities through such media as:

(a) Newspapers, newsletters, local magazines, etc.; include pictures of action scenes, extent of program, persons involved and other highlights.

(b) Radio, television; might interview outstanding students about their learning experiences or display on television some "before and after" scenes, etc.

(c) Posters, bulletin boards--display of pictures and notations that accurately depict the program in action.

(d) Slidefilm, 2 X 2 slides, etc.--use in classes to motivate students and with adults to show what their sons can do.

(e) Group meetings such as P.T.A., out-of-school classes, agricultural organizations and agencies--keeping all interested persons informed and interested in the program and how they might help assure its success.

12. Have a well-defined and well-planned schedule of work ahead of teaching in the farm machinery unit.

13. Keep up-to-date; teach the practical and theoretical by properly integrating the two for better student understanding and appreciation of the processes involved. (Good teaching demonstrations by the teacher provide confidence for students as they are aware of competent supervision.)

14. Use positive teaching of good practices; expect and get good workmanship; help students evaluate their progress and achievement; provide sufficient time for students to solve their problems.

15. Emphasize that well maintained machinery is safe machinery and more efficient machinery. Encourage all students to repair and maintain all machinery on their farms, not just one which is brought into the school shop. (This should be part of the results of a successful unit.)

16. Make sure that each machine or piece of equipment going out of the shop is finished properly and is in good mechanical working order. This helps assure continued support and cooperation throughout the community. As an additional publicity element, the name of the department, with some standard notation, might be stenciled onto the finished machinery.

17. Provide or arrange for adequate teaching and work space in the school shop. Teachers generally have found that a surfaced patio is desirable where machinery repair and maintenance is being studied. Adequate storage for machinery parts for each student is a prime necessity.

18. Use good judgment in planning, teaching and following up the farm machinery unit.

Total Teaching

> Even though much attention has been given here to planning for effective farm machinery teaching-learning, it should be recognized that the "total teaching" in a complete program should be equally of concern to a teacher of vocational agriculture. Good planning should precede all teaching. If it does, teachers of vocational agriculture will find that "learning is more definitely assured and that teaching is certainly more satisfying."[23]

As previously stated, the test of the vocational agriculture program is achievement on the farm. Do our present and prospective farmers actually put into use on the home farm the principles and practices they have been taught? Mack M. Jones presents this thought concerning the question:

> The test of a farm shop program in a vocational agriculture course is whether or not the boys actually put into use on the home farm the principles and practices which have been taught in the school shop. It is not unreasonable to

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[23]George W. Sledge, "Include Farm Machinery Instruction," The Agricultural Education Magazine, XXIX (March, 1957), 208-210.

> expect that the boy, if he is given good shop training in school, will begin repairing some of the equipment and machinery, and constructing some of the simpler applicances needed around his home during his school days. And if the shop program has been really effective, a permanent interest in things mechanical will have been established, and the boy will not cease to learn and further develop his shop skills and abilities after he leaves school and becomes a farmer. His tools, machinery, buildings, fences, and other equipment will reflect the thoroughness and ultimate effectiveness of his shop training in school.
>
> If a boy is to do good shop work at home either now, or later when he becomes a farmer, there are certain requirements or conditions that must be met. These requirements should have a very definite and direct bearing on the school shop program.[24]

The teacher's training is certainly an important factor in the teaching of any subject. On numerous occasions the writer has been informed that a certain area of farm mechanics training is not offered to present and prospective farmers because the teacher has had no training in that area, or feels that his training is inadequate. M. R. Wilson discusses this important factor for The Agricultural Education Magazine. His remarks are as follows:

> A teacher-training institution may be compared to a manufacturing plant and has similar problems. The end product of a manufacturing plant depends to a considerably extent upon the plant facilities, the personnel, and the raw product. One of the first questions we might ask in the preparation of teachers is this: "Are the plan and equipment adequate for the proper training of these men?"
>
> The plan and equipment should be adequate, if properly organized, as this training is carried on in our A. & M. colleges in most, if not all cases. And they pride themselves upon being adequately equipped to train teachers for this work. If they are not, it is the duty of the state director and the state supervisor of vocational agriculture to call attention to the inadequacy and to cooperate in seeing that the proper housing facilities and equipment are made available for this training. Colleges of agriculture and mechanic arts should be very much

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[24]Missouri State Department of Education, Methods of Teaching and Organizing Farm Shop Work, Bulletin No. 24, (Jefferson City, Missouri, 1934), p. 51.

interested in giving these trainees the proper housing and equipment for their training, as every vocational agriculture teacher while in training represents a potential high-school group of from 20 to 60 students besides the contacts of the out-of-school group, the night-school group, and the parent contacts. The teacher of agriculture is one of the best missionaries the A. &.M. college has, and it behooves institutions to see to it that the proper housing facilities and equipment are provided for them while in training.

In every college that professes to prepare teachers for farm mechanics, there should be provided a good-sized departmentalized shop room and classroom with the necessary equipment for the teaching of farm mechanics skills. This training is of sufficient importance to command adequate housing, and the farm shop room and classroom should be fitted as representative of the plan to be carried out in the high school shops in regard to organization, tool cabinets, departments, equipment, and library.

What is to be said of the personnel that is to train teachers in their farm mechanics technical and professional skills? The first requisite should be a sympathetic attitude on the part of the instructors toward the men in training and toward the type of work the men are being trained to perform. In a number of cases, these trainees are taught by instructors of agricultural or mechanical engineering in classes that also enroll embryo engineers, and the pattern of the course is cut for the engineers. Doubtless these engineering courses are of some value to prospective teachers, but these trainees do not get much sympathy from the members of the engineering faculty.

It would appear to be advisable to have one man in each of these institutions to head up the training in farm mechanics and to teach a few of the courses necessary to prepare the men to be good teachers of farm shop. His main interest should be to see that trainees acquire the necessary skills, organizing ability, and confidence in themselves to put on a good shop program. This man may be an agricultural engineer, but if so, he should be relieved of the responsibility of training engineers and his whole attention given to the field of farm mechanics. The program in vocational agriculture is large enough and of sufficient importance to warrant adequate training personnel.

The raw product, of course, is that group of men taking courses in agriculture who have signified their intention of becoming teachers of agriculture, or, as in the case of a couple of states, other shop teachers who will take over the farm mechanics program in the high schools.

For my part, I will select men to teach farm mechanics who have been reared on a farm, who worked on a farm, and who know the farmer's shop problems. A man who has worked for

some time as a mechanic in a small town and who has to deal exclusively with farmers and farm mechanics problems can be trained to be a successful farm mechanics teacher.

In every group of prospective teachers of vocational agriculture who go thru the training courses, one will find a few who are outstanding in mechanical aptitude and ability. These are the men who might be selected for those places where it is necessary to have a separate shop teacher who must work with the vocational agriculture teacher.

Present Training in Farm Mechanics Inadequate

Let us consider the men coming thru the A. & M. colleges with the intention of becoming teachers of vocational agriculture, who will need to teach farm mechanics as a part of their work. These men are required to have approximately 130 semester hours credit for graduation and are expected to spend considerable time teaching farm mechanics.

A large per cent of these men have the capacity to be trained for farm mechanics instruction as well as agriculture instruction. They are eager to learn this phase of the work as they realize its importance, especially in the middle west where every farmer has such a large investment in equipment. If a man is qualified to be trained as a teacher of vocational agriculture, he is qualified to be trained to handle the farm mechanics part of the work.

The colleges are sadly deficient in the amount of shop training required of the prospective farm mechanics teacher. The time is not properly equalized. A man must have the necessary skills and be able to use his head to be a successful farm mechanics teacher. We are not fair to the men. We don't give them enough shop work while in school. A requirement of only three semester credit hours is absurd. Eighteen semester credit hours are all too few. Twenty-five would be much better. But only a certain number of credit hours can be crowded into a four-year course. Oregon State College suggests that the men who expect to be vocational agriculture teachers spend an extra year in college making five years in all, so that they can get the additional work necessary to do a good job of teaching vocational agriculture and farm mechanics. If the salary for these teachers would be proportionate to the time spent in school, this plan would be fine. As it now stands, we are not justified in asking a man to spend five years in training.

As I view this whole program of vocational agriculture from a national standpoint, I feel that some re-adjustment is necessary and that more time should be given to farm mechanics training during the time the teacher is in college. After all, the cost of equipment, repairs, cost of trade-ins, and length of time equipment can be used, depending upon the care given to

it, are all factors that materially affect the profit or loss of the average farm.[25]

In 1954 Blackman made a study entitled "A Suggested Farm Mechanics Training Program for Prospective Teachers of Vocational Agriculture in Louisiana". His conclusions are as follows:

1. The present farm mechanics training program at the Louisiana State University should be reorganized in order to give more emphasis to the farm buildings and conveniences area, rural electrification area, and farm shop area.

2. A number of the teachers of vocational agriculture in the State of Louisiana do not teach any farm mechanics to the all-day program.

3. A great percentage of the teachers of vocational agriculture do not teach any farm mechanics to adult and young farmer classes.

4. A study should be made to determine why farm mechanics is not being taught in some of the vocational agriculture departments in Louisiana.

5. An in-service training program should be developed in order to meet the expressed needs of the teachers.[26]

A further reference to the amount of training in farm mechanics that teachers of agriculture receive was made by R. F. Nalley:

> There seemed to be no correlation between the number of years teaching experience the teachers have had and the shop program in the schools. There was no indication that the more experienced teachers had a more effective shop program than the teachers with fewer years experience.
>
> The semester hours of shop training that a teacher had in college is often mentioned as being a factor in establishing a successful shop program. The teachers were asked to state whether they considered their college training as being sufficient to enable them to do effective farm shop work. Ten of the forty-two teachers considered their training sufficient,

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[25]M. R. Wilson, "Preparation of Teachers for Farm Mechanics," The Agricultural Education Magazine, XVII (November 1939), 92.

[26]Albert Ernest Blackman, A Suggested Farm Mechanics Training Program for Prospective Teachers of Vocational Agriculture in Louisiana, Master's Thesis, Louisiana State University, 1954, pp. 75-78.

but the remaining three-fourths stated that they did not have enough training in college to prepare them to do effective teaching in the farm shop. The ten teachers reporting sufficient training had an average of eight and one-third semester hours of college work in shop while the thirty-two teachers reporting insufficient training had an average of two and two-tenths semester hours.[27]

The amount and kind of shop equipment is very important in the teaching of farm mechanics. R. F. Nalley makes the following comments concerning equipment:

> Eighty-three per cent of the forty-two shops in district one were reported as having equipment with a total estimated value of less than $3000.00 The teachers in 88 per cent of the selected shops reported equipment valued at more than $3000.00.
>
> In the bulletin, Plans and Facilities for Vocational Agriculture Departments, the committee offered a suggested list of major shop tools and equipment would cost approximately $4500.00.
>
> Summary
>
> A list of the different phases of farm shop work that probably should be stressed in the farm shops in district one has been offered by W. M. Mahony, District Supervisor. This list includes:
>
> 1. Woodwork
> 2. Hot and cold metal work
> 3. Electrical work
> 4. Plumbing
> 5. Painting farm buildings
> 6. Repair and maintenance of farm equipment
>
> A number of the shops in district one apparently are not equipped with the necessary tools and equipment to facilitate teaching the students the essential jobs connected with the

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[27] Riley Franklin Nalley, An Analysis of the Farm Shop Program in Supervisory District One, South Carolina, With Suggestions for Improvements, Master's Thesis, Clemson Agricultural College, 1953, pp. 43-44.

different phases of the farm shop program. There seems to be a definite need for an assortment of hand tools and small equipment in most of the shops. Several of the questionnaires convey the impression that the shops concerned are, in most cases, better equipped with power tools than with hand tools. However, the condition of some of the machines would indicate that the agriculture teachers should be more familiar with the large equipment to facilitate the repair and maintenance of this equipment.

In several instances it seems that shops are equipped with tools that may not be as essential to the farm shop program as some tools that are not available in the shop. The estimated value of the equipment in the shops would indicate that a majority of the shops in district one do not have the equipment recommended by the South Carolina State Department of Education.[28]

Mr. Nalley makes these additional statements concerning the various areas of farm mechanics instruction:

There is an indication that some of the schools studied were not offering instruction in all the areas of farm shop work that are considered essential by supervisors and teacher trainers. Only eleven, or 27 per cent, of the thirty-eight district one shops reported that instruction was offered in all the areas listed. Woodwork was apparently the area of instruction emphasized by the majority of the teachers, as four-fifths of the teachers offered instruction in this phase of farm shop work. However, the data indicate that the other areas of instruction were probably being neglected by 50 per cent of the teachers. Approximately one-sixth of the teachers reported that they did not offer instruction in any of the areas.[29]

C. T. Thompson made a study in 1938 entitled "Farm Shop Jobs for the Vocational Agriculture Department in Louisiana". He made the following suggestions and recommendations:

Selection: Obviously the teacher cannot use all of the farm shop jobs included in this study due to limited time and resources. Therefore, he must use those jobs which count most under the conditions that face him. The two chief factors to guide him in selection are significance and probability. Obviously that boy is best equipped to perform a given job who can solve its most significant problems and those that he most probably will face.

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[28]Ibid., pp. 32-33.

[29]Ibid., p. 41.

Subordinate criteria, however, are useful in selection. The following are suggested as worthy of consideration by the teacher who is building up the content of his course. (1) Type situations--There are certain teaching situations and job operations which have greater value than others because the learning acquired through them is effective in a relatively wide range of circumstances and insuring a greater "carry over" to other related jobs or operations. (2) Frequency--See to it that the boy learns those jobs that are called for most surely and often in the performance of his farm enterprises. (3) Vital significance--A rarely used but very important criterion which the teacher must not lose sight of. For instance, it may seldom be necessary for a boy to replace a window pane but he should have the ability to do so when the occasion arises. (4) Proved superior merit--Methods and practices better than the highest standards of his community should be taught. Teach those things that are known to be in the line of progress. (5) Local and seasonal opportunity--Active participation in farm shop job operations should follow local and seasonal limitations. Thus, the best time to teach how to sharpen a plow is probably during the plowing season. (6) Sufficient possession--Use job operations the boy does not already know how to do efficiently. (7) Capacity--Choose only those jobs or operations which the boy is mentally and physically capable of doing. (8) Interest--Working with a boy in pursuit of an interest which makes the job worthwhile to him is good vocational teaching. (9) Immediate needs--Use, in some instances, the job operations that will satisfy the boy at that particular time. For example, a boy may desire to sharpen his pocket-knife. Teach him how to use the whet-stone properly. This is taking care of an immediate need of the pupil.

Standards

Relatively high standards of proficiency in the performance of job operations should be set up. How high, it is difficult to determine. Upon the good common-sense and judgment of the teacher, checked by observation of the practices of superior farmers, depends in no small measure the efficiency of the farm shop job and operations course in agriculture for those who would be farmers.[30]

"Farm Shop Lay-Out for Louisiana Vocational Agriculture Departments" is the title of a study made by Lewis A. Berger in 1938. His conclusions and recommendations were as follows:

This study warrants the recommending that each farm shop

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[30] C. T. Thompson, Farm Shop Jobs for the Vocational Agriculture Departments in Louisiana, Master's Thesis, Louisiana State University, 1938, pp. 212-213.

from the very start be supplied with enough of the fundamental tools to perform the farm shop jobs that are commonly performed on the farms of the State. These fundamental tools are: the hammer, the saw, the square, the plane, the screw driver, and the bit brace. This list should be supplemented by adding those tools that are needed in performing all of the farm shop jobs on the average farm. All tools should possess the standards of quality as set up in this study, which can be supplied by reliable tool dealers, or reliable tool manufacturers.

This study further warrants the recommending to the teacher of vocational agriculture the use of these farm shop plans to guide him when building or remodeling a building for a farm shop for his own particular condition. At all times the teacher should keep in mind these guiding principles in planning a farm shop building:

1. The rectangular building always is perferable for a farm shop, with floor space of 50 square feet per student which has been accepted by authorities.

2. The floor space where the farm machinery is to be repaired and the forge is located should be of concrete while the remainder should be built of wood.

3. A good policy is to have only one door other than the large door used to enter large farm machinery.

4. If the building is wider than twenty-four feet the ceiling will need to be higher than 12 feet. Light should enter from at least two sides and one square foot of glass area for every five square feet of floor space. The window sills should be three feet from the floor. Frosted bulbs should be used to admit indirect light.

5. The color should be considered before painting a shop. Naturally, white would be preferable, but since it is so hard to keep clean, aluminum is preferable in this case. Aluminum is more expensive per gallow, but it will cover more surface.[31]

Another factor that affects the teaching of farm mechanics is shop equipment. The school shop should be equipped with the tools and power equipment necessary to teach the farm mechanics jobs the needs of the community indicate. Listed below are some views expressed by Mack M. Jones:

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[31]Lewis A. Berger, Farm Shop Lay-Out for Louisiana Vocational Agriculture Departments, Master's Thesis, Louisiana State University, 1938, pp. 76-77.

Occasionally the shop teacher has the problem of buying equipment for a new shop, and more frequently the problem of adding to or improving the equipment already in use. He may be confronted with the problem of whether to buy more hand tools or to buy a power saw or a lathe, or possibly some other power equipment which has become popular in the last few years. Or should he replace some of the older planes, or that vise, or this post drill, or possibly some other piece of much-used equipment which has not proved quite "boy proof" and has become pretty badly worn?

The teacher can usually solve such problems satisfactorily if he will keep in mind the ultimate objective of shop work: that is, to train the boys so that he will do creditable shop work on his own farm. (If a large proportion of the students do not do appreciably better shop work than their dads, something is wrong with the program.) Questions regarding equipment for the school shop can be largely answered by keeping in mind the kind of equipment the boys will have to work with at home or should have when they grow up and become farmers themselves. Shop tools and equipment on most farms are of the hand variety and it appears that this kind will predominate for many years, altho each year sees more and more farms equipped with electricity and some farmers buying power tools.

It would appear, therefore, that the main part of the tools for the school shop should be good substantial hand tools, but with a few useful power tools such as a power grinder, a power drill press and possibly a power saw. It should be kept definitely in mind, however, that the unwise use of power tools may defeat the main purpose of shop instruction. If a boy has not learned to use a hand saw effectively and with ease and confidence, but has been allowed to run the power saw, he probably will not do very much shop work at home on his own farm.

Many school shops are short on hand metal-working tools such as hacksaws, files, metal-working vises and drilling equipment. Many times a single piece of equipment was bought when the shop was organized and this single tool has had to serve all the boys in large classes. In many such cases, these single tools cannot be used for effective instruction but are kept for an occasional job that may arise. If more such tools will facilitate or improve instruction, the teacher should have no hesitancy in buying them, for the school shop is primarily a place of instruction. With the increase in the use of metal and the decrease in the use of wood in implements and farm equipment, it is becoming more and more important to include instruction in metal work in the farm shop course.[32]

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[32]Mack M. Jones, "Keeping Shop Equipment Up-To-Date," The Agricultural Education Magazine, XII (June 1940), 234.

Teachers of vocational agriculture have to keep up with new technical information in a very broad field. The rapidity of change makes their tasks much more difficult. They cannot be expected to keep up-to-date without the assistance of the state supervisor staff and the teacher training institutions. It has been definitely proven that short intensive in-service training courses are most effective in farm mechanics. The following article gives some timely tips on in-service training workshops in farm mechanics:

> The Farm Mechanics Workshop for teachers was in full swing. A Vo-Ag teacher had just finished demonstrating how to line up a trailer hitch. Criticisms on his methods and techniques were in order.
>
> "It was good but he didn't follow up. He should have had some of us repeat the steps."
>
> "I thought I knew how, but he showed me a couple of new wrinkles."
>
> "He started in too soon--not enough motivation for the average student."
>
> "There were some good points: he knew his job, he kept interest alive by questions, and he gave his steps in logical order."
>
> This is just a brief sample of the type of professional improvement and skills work that covered 30 hours of class and shop activities, and extended from Monday through Friday, during one of the mid-summer weeks at a high school in southern California.
>
> The course, which was held for the second time this last August, gave college credit of 1½ quarter units through California State Polytechnic College. There is little expense for the teachers enrolling since the organization of this extension course and the conduct of the daily class and shop work are handled by the Regional Supervisor of Agricultural Education.
>
> Permission is requested of a centrally-located school to hold the course. Classroom and shop facilities must be better than average. In 1954, the course was held in the El Cajon High School, whose agricultural unit is one of the very finest in the

State. In 1955, it was held at Redlands, California, where, besides a fine classroom and adequate shop, sleeping and shower accommodations were furnished by courtesy of the Redlands High School.

Eighteen hours of shop activities and eighteen hours of class work served to cover the course of study laid out.

Example of Class Procedure

To emphasize the value of organization and standardization of procedures, the class is organized as you would a high school class. Roll is taken by a member twice a day. There is a shop clean-up man, a tool man responsible for directing these activities, and one man serves the entire week as "The Whistler". With a few exceptions he stops class discussion or shop work by a whistle on the hour and whistles the members back on the job at the end of 10 minutes.

Class discussions and shop activities alternate. Shifts are usually made on the hour, and no longer than an hour and a half is ever allowed for one session unless a guest instructor, or speaker, is in charge.

It will be noted by a glance over the course of study which follows that major objectives for the week's course cover professional policies, philosophy and teaching techniques, and organization. Shop skills and abilities are secondary, and largely the result of demonstration work by the individual class members.

General Content of Work Shop

1. Maintaining Objectives and Principles of Farm Mechanics.

   a. Affect on farm mechanics in view of industrialization of rural areas.

   b. Applying objectives to every-day problems such as-- power tools to use, type of jobs to build, ultimate plans of the boy in local community.

2. Farm Mechanics Procedures and Methods, Including:

   a. The one type of farm survey of value in farm mechanics.

   b. The development of "shop citizenship" as a major first-semester objective.

   c. How we get worth-while jobs.

   d. Policies on handling shop safety.

e. Standard procedures on opening and closing a shop session.

f. Work loads and foreman duties.

g. Developing standards of workmanship.

h. Value of farm mechanics at the fair.

i. Financing and financial records.

3. Physical Organization of the Farm Shop.

a. A check list on farm shop facilities.

b. The layout of farm shops (flannel board).

c. Rearrangement of a typical shop (flannel board).

4. Getting your Administrator and School Board Acquainted With Farm Mechanics.

a. Farm mechanics as another Ag course.

b. Special characteristics and needs.

5. Shop Demonstrations by Members.

a. Demonstration of "interest getters" by instructor.

b. Safety demonstrations on saw, grindstone, drill and torch.

c. Layout of a foundation.

d. Wiring a 3-way switch.

e. Remove handle from shovel.

f. Repair mowing machine sickle bar and sickle.

g. Replace handle in hammer or shovel.

h. Demonstrate spark tests for metals.

i. Use of shearing and slitting chisels.

j. Use of new plastic paints.

k. Adjust trailer wheels and hitch.

l. Adjust tractor clutch, magneto, hydraulic hitch.

m. Reeving a block and tackle.

n. Cutting a common rafter.

6. Special Guests.

   a. One-half day on new tractor adjustments and hitches by a local machinery company representative.

   b. Two-hour discussion of financing for the farm shop by a county school business consultant.

Devices and Methods Used

A 3' X 6' flannel board was used to focus attention on such items as the shop layout. Using a scale of ½" to 1', cotton yarn showed the outline of a typical shop. Cut-outs of tools, benches, and movable equipment were used to give effective guidance to discussions on shop layout.

Each instructor in the course was notified ahead of time to prepare one of the demonstrations listed. They furnished their own needs and were subject to rather critical evaluations of the class after completing the 20-40 minute demonstration. Motivation, maintenance of interest, and "follow-up" were emphasized.

Even though each teacher enrolled was an experienced shop and Ag teacher, none failed to remark on the many techniques, skills, and "tricks of the trade" learned from watching each other demonstrate. Gaining skills in such jobs as welding was not the basic need of these teachers, but methods of application of these skills and techniques of teaching to farmers and students took up much class time.

Such an extension course is not unusual in its scope or difficult to conduct. Some careful planning and organization is essential, and the desire for professional upgrading in farm mechanics on the part of the teachers enrolled is a fundamental need if such a course is to be successful, as this one seemed to be.[33]

The survey of related information for this study would not be complete without making reference to the splendid work industry is doing in making possible many in-service training workshops in farm mechanics. An appreciative teacher pays tribute to these workshops in the remarks listed below:

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[33]M. K. Luther, "A Farm Mechanics Workshop," The Agricultural Education Magazine, XXVIII (February 1956), 189.

An experiment by the Allis Chalmers Co. of Milwaukee in sponsoring a down to earth workshop for Vo-Ag teachers in southeastern Wisconsin proved to be very successful and very educational in acquainting the instructors with new developments in farm equipment. With the advancement in new and modern farm equipment it is often very difficult for the busy Vo-Ag instructor to keep properly informed on what is taking place in the field of farm equipment manufacture.

The work shop included explanations of the engineering features of the tractor, plow, disc, drill, manure spreader and subsoiler by engineers and representatives of the company. In addition there was demonstrated, under actual farm conditions, how each machine operated. Each Vo-Ag instructor was given an opportunity to operate each machine if he so desired. The ability to properly operate a machine and discuss the many features of new farm equipment is one good way for the Ag instructor to really get to know his farmers and students. Today students are definitely mechanically minded and are interested in the design and the operation of new farm equipment.

Types of Assistance Varied

Several devices which could be made by students or teachers as teaching aids in illustrating the principles involved in making proper adjustments of hitches and plow settings also were shown. Such devices used in the classroom not only would make the job of teaching easier for the instructor but would make the explanation much clearer and understandable for the student.

This field day was not devoted alone to the merits of the special features of the Allis Chalmers farm equipment but considerable time was spent on the value of proper maintenance of farm machinery. New developments in the types of oil designed for the type of work the tractor is to do were discussed. Fuels too have changed. The high catalyst fuels of today do not hold up under long storage on the farm. Fuels are designed to be used in the different seasons of the year and should not be carried over from one season to the next. The engineers stressed the importance of the proper care of the air cleaner in relationship to the efficient operation of any make of tractor. Oftentimes the air cleaner's importance is underestimated and neglected. It was pointed out that the kind of dust or dirt found in dirty air cleaners didn't seem to make any difference, it all had about the same wearing effect upon the engine.

Workshop Well Planned

The over-all workshop sponsored by the manufacturer for Vo-Ag teachers was well planned and seemed to serve a real purpose. The idea caught fire when Carl Schuster, former

Vo-Ag teacher and veteran trainer, went to work for the Allis Chalmers Company. Having had the experience of being an Ag instructor, Carl sensed the need for more such training for other teachers. Members of the state department of Vocational and Adult Education and Mr. James Merson, Department Head, Agricultural Engineering of the California State Polytech College and a goodly number of Vo-Ag teachers gave their stamp of approval on this type of a workshop as a real means of giving information and practical experiences.

Significant was the fact that the workshop was held on a Saturday from 9:00 a.m. to about 4:00 p.m. which meant that the instructors attending deprived themselves of some of their free time that might have been spent at home with their families or possibly on a fishing trip. This indicates that this workshop must have been rather worthwhile. The company provided the coffee and doughnuts for the morning coffee break and an excellent noon meal for the group.

Need for More Such Workshops

We as Ag teachers must realize that such a workshop took a great deal of planning and time from employees of the company. Their efforts to help us do a better job in teaching our students should not go unrecognized. However, most types of industry, I believe, are willing to give their time and effort to help Vo-Ag teachers become better informed on new ideas and developments in their field if they know just what we want. It is certainly good public relations from the manufacturer's standpoint and very informative for the Vo-Ag teacher. Let's have more of this type of workshop. We are bound to do a much better job of teaching.[34]

It is generally conceded that some of the best teaching in vocational agriculture is done on the farm during regular farm visits. In the paragraphs below C. C. Scarborough presents several observations on this subject:

A few weeks ago I was at the home of a boy in his 4th year of vocational agriculture. His teacher considered him to be a "good" student. He was active in FFA, holding a chapter office. His farming program was "about average". His shop work at school was OK, largely woodwork. He had A's and B's in vocational agriculture for the many months during the previous three years.

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[34]Neal C. Nicholson, "Industry Provides A Field Day," The Agricultural Education Magazine, XXIX (April 1957), 230.

> Yet, as I stood in the cluttered yard, with no lawn, shrubs, walks or drives, I was troubled. Without taking a step I could see three peices of farm equipment rusting in the weeds that might well have been the heart of a real farm mechanics program. The need for an improvement project in home beautification could hardly have been missed by a first year agriculture boy. Fences were an eyesore as well as unreliable in restraining livestock. The lots near the barns were filthy. Many other needs were apparent, such as painting, but I mention here only the most obvious things, and only those that any Vo-Ag boy could do with little or no expense.
>
> Why this situation? Perhaps many reasons. One thing is certain. On-farm instruction in this case was only a term in the books and magazines and something talked about at conferences or in college classes. Certainly the values of on-farm instruction had never trickled-down to this boy on his farm. BUT WHY?
>
> Apparently there are two basic reasons for lack of effective on-farm instruction.
>
> First, the teacher does not get on the home farm of the student.
>
> Second, there is little or no connection between what happens at school and at home.[35]

Many comments have been made concerning the farm mechanics phase. School administrators express doubt many times that an expensive farm mechanics lay-out can be justified. The article below indicates what can be done in a community with a good farm mechanics shop and a live wire teacher:

> Farm shop is making great strides in the South. I visited Vo-Ag departments in several southern states last summer and found that practically all instructors visited were placing increased emphasis on farm mechanization.
>
> Stony Creek, Virginia, is a small town in a typically rural setting. The Vo-Ag class in the high school is rather small, by the standards of many school people. But a man like Instructor Mike Poole is not limited by the size of his regular Vo-Ag class. The farmers and their families of the whole area are his "domain".

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[35] C. C. Scarborough, "On-Farm Instruction," The Agricultural Education Magazine, XXX (July 1957), 1.

Because of his large, well equipped farm shop and his ability as a teacher, his regular boys get fine training. But when a man offers an evening shop program which attracts 60 to 75 adults, that's really serving the community.

Classes are held every Thursday evening from 7 to 10 throughout the school year. A young progressive farmer, who is an especially well trained farm mechanic, is in charge of the class. Mike "helps," but stays in the background.

A brief survey of the work done last year will show that it wasn't just a series of "bull sessions," either. Eight pieces of machinery were completely rebuilt, 12 overhauled, 253 repaired and 233 pieces constructed.

Demonstrations are given by the instructor and the teacher as needs arise. Classes or "schools" are also conducted in welding, hard surfacing, tractor maintenance and electric wiring. But the bulk of the time is spent, as Mike puts it, in letting the farmers do their own work. Naturally, there is supervision by the instructors, and the farmers help each other.

For anyone thinking about starting such a class, Mike has some suggestions. Among them are:

1. Have a thorough knowledge of the community.

2. Have frequent visits to farmers' homes to help locate jobs.

3. Have a well-equipped shop with a good stock of supplies.

4. Have a good lay-instructor--a progressive young farmer.

5. Keep accurate records of attendance, jobs completed, and supplies sold.

6. Let the farmers do their own work.

7. Have a friendly interest in the farmer and his problems.

I am sure that Mike would say that the last suggestion is a must. He also conducts a large cannery summer school which is housed in a separate building. When I was there, the assembly line was really rolling. Farm families in the Stony Creek area are going to eat heartily this winter.

How's this for a complete program? A youngster in the Vo-Ag class, an older brother in the Young Farmer group and Dad in the evening shop classes--all during the school year! With

Mother in the canning center in the summer, that makes it about complete. How much more complete can you get?[36]

[36] C. B. Davenport, "Shops in the South," County Agent Vo-Ag Teacher (December 1956), 38-39.

CHAPTER III

INTERPRETATION OF DATA

Farm mechanics is an integral phase of the instruction in vocational agriculture. This part of the agricultural program enables the pupil to learn the mechanical phases of farming and to carry them out on the farm. Simply to provide farm mechanics training is not enough. It must be planned and the pupil guided into application in his farming program. The teacher of vocational agriculture is expected to assume the responsibility of guiding and directing each student into the development of a sound mechanical program that will give the pupil the necessary mechanical training and experience for him to become successful in the occupation of farming.

The normative-survey method with the questionnaire technique was used in securing data for this study. The writer employs the data from 174 completed questionnaires returned by teachers of vocational agriculture and 157 completed questionnaires returned by high school principals serving in schools having a vocational agriculture curriculum in making this evaluation. This represents a 74 per cent return by teachers and a 67 per cent return by principals which is believed to be a fair representation of teachers and principals in this state.

The data in Chapter III of this dissertation are concerned with the opinions, practices and training of teachers of vocational agriculture and opinions, observations and practices of principals of high schools having departments of vocational agriculture relative to the teaching and administration of the farm mechanics phase of the teaching program.

In order for the investigator to determine the factors that affect the teaching of farm mechanics in Louisiana, the data are arranged to include the following:

Questionnaire Sent to Teachers of Vocational Agriculture

1. Years teachers have taught vocational agriculture
2. Length of tenure at the present school
3. Enrollment in all-day, young and adult farmer classes
4. Number of farm mechanics shops
5. Size and equipment of farm mechanics shops
6. Items considered in planning and organizing the farm mechanics program
7. Areas of farm mechanics instruction included in teaching programs
8. Time spent in farm mechanics instruction
9. Schedule plans
10. Farm mechanics training received on the home farm
11. Farm mechanics training received in high school
12. Farm mechanics training received at the undergraduate level
13. Farm mechanics training received at the graduate level
14. Farm mechanics training received through in-service training
15. Farm mechanics jobs taught to all-day, young and adult farmers last year

Questionnaire Sent to High School Principals

1. Length of tenure as a principal
2. Tenure of principals in present schools
3. Departments conducting a farm mechanics program
4. Shops constructed during principal's tenure at present school
5. Location of vocational agriculture facilities

6. Non-farm mechanics activities included in farm mechanics classes
7. Teachers who submit annual teaching plan to the principal
8. Principals and agriculture teachers having long-time plan for improvement of farm mechanics facilities and program
9. Frequency of meetings with vocational agriculture teacher
10. Special assignments given teachers of agriculture
11. Other subjects taught by teachers of agriculture
12. Selection of vocational agriculture students
13. Principals familiar with the purposes of farm mechanics instruction
14. Principals' attendance at supervisory conferences
15. Principals' criticisms of the farm mechanics program
16. Principals' rating of his farm mechanics program

The teachers of agriculture represented in this study were requested to list the number of years that they have taught vocational agriculture. The purpose of this question was to determine how many years the teachers who cooperated in this study had been teaching. Table I indicates the number of years the teachers of agriculture who are represented in this study have taught.

TABLE I

Number of Years Teachers Have Taught Vocational Agriculture

Number of Years	Number of Teachers	Per Cent
1 - 5	44	25.4
6 - 10	44	25.4
11 - 15	31	17.9
16 - 20	32	18.1
21 - 25	16	9.1
26 - 30	5	2.9
31 - 35	1	.6
Over 35	1	.6
Total	174	100.0

These data show that over one-half of the teachers fall into the one to five year group and the six to ten year group as far as teaching experience is concerned. The indications are that most of our teachers have experience ranging from one to ten years.

The number of years of teaching experience which the teachers of vocational agriculture who cooperated in this study have had ranged from one year to thirty-six years.

To determine the tenure of the teachers in their present teaching position, each teacher was requested to state the number of years that he had taught in the school where he was teaching. The purpose of this question was to determine the period of time the teachers remained at one school.

The number of years the teachers have taught in the school where they were teaching at the beginning of this study is revealed in Table II.

TABLE II

Years Tenure in Present School

Number of Years	Number of Teachers	Per Cent
1 - 5	44	25.4
6 - 10	56	32.0
11 - 15	40	23.0
16 - 20	25	14.3
21 - 25	7	4.1
26 - 30	1	.6
Over 30	1	.6
Total	174	100.0

It is indicated that the largest percentage of the teachers are in the group having a tenure of six to ten years. It is also indicated that the teachers in Louisiana remain in the same teaching position long enough to establish a good farm mechanics program.

In order to determine the type of degrees and how many teachers had acquired degrees beyond that of a bachelor's, each teacher was asked to state the type of degree held. These data are revealed in Table III.

TABLE III

Type of Degrees Held by Teachers of Vocational Agriculture

Type of Degree	Number of Teachers	Per Cent
Bachelor of Science	174	100.0
Master of Science	76	43.6
Master of Education	14	8.0
Others	4	2.3

All of the teachers cooperating in this study have the Bachelor of Science Degree. A total of 94 or 54 per cent have acquired degrees beyond that of the bachelor's.

To determine the number of years each department has been established, each teacher was requested to give the number of years there had been a department of vocational agriculture in the school where he was teaching. These data are presented below.

TABLE IV

Number of Years There Has Been A
Department of Vocational Agriculture in the School

Number of Years	Number of Schools	Per Cent
1 - 5	10	5.8
6 - 10	21	12.0
11 - 15	10	5.8
16 - 20	59	34.0
21 - 25	33	18.9
26 - 30	13	7.4
31 - 35	7	4.0
36 - 40	8	4.1
Over 40	3	1.7
Unknown	10	5.8
Total	174	100.0

It is disclosed that 59 or 34 per cent of the departments have been established from sixteen to twenty years. The indications are that the establishment of departments of vocational agriculture started slowly after the passage of the Smith-Hughes Act in 1917 and reached the highest peak in the years 1933-1937. At the present time we have 237 departments in Louisiana.

The writer considers next in order the all-day enrollment of the vocational agriculture departments.

TABLE V

Enrollment in All-Day Classes of Vocational Agriculture

Number of Students	Number of Departments	Per Cent
10 - 19	7	4.0
20 - 29	25	14.4
30 - 39	43	24.7
40 - 49	44	25.3
50 - 59	23	13.2
60 - 69	18	10.4
70 - 79	9	5.2
80 - 89	5	2.9
Total	174	100.0

Approximately two-thirds of the schools show an enrollment of a size that would enable the teacher to do an outstanding job in organizing his farm mechanics teaching. Most leaders in farm mechanics recommend a class of ten to fifteen pupils and certainly never more than twenty. The indications are that the majority of the schools cooperating in this study meet these recommendations. It is obvious that approximately one-third of the schools participating in this study have a problem because of enrollments that will make shop classes of a size that taxes facilities and the instructor. Shop instruction is primarily of an individual nature and, as such, limits the number of individuals an instructor can serve. Therefore, the size of the enrollment is definitely a factor that affects the quality of teaching in farm mechanics.

A complete program in vocational agriculture consists of all-day, young and adult farmer classes. It is just as important that young and adult farmers receive instruction in farm mechanics as the all-day classes. Tables VI and VII reveal the enrollments in young and adult farmer classes.

TABLE VI

Enrollment in Young Farmer Classes

Number of Students	Number of Departments	Per Cent
1 - 5	11	6.5
6 - 10	61	35.0
11 - 15	21	12.0
16 - 20	9	5.2
21 - 25	5	2.9
26 - 30	1	0.6
No Class	66	38.0
Total	174	100.0

TABLE VII

Enrollment in Adult Farmer Classes

Number of Students	Number of Departments	Per Cent
1 - 10	41	23.6
11 - 20	62	35.6
21 - 30	27	15.5
31 - 40	8	4.6
41 - 50	3	1.7
51 - 60	1	0.6
Over 60	2	1.1
No Class	30	17.3
Total	174	100.0

A review of the above tables reveals that many of the schools surveyed are not teaching young and adult farmer classes. Many of these schools are probably operating under Plan "D" which requires that young and adult farmer classes be taught if the department is to meet requirements as set up in the State Plan for Vocational Education. The writer made no attempt to determine the number of classes held by each school surveyed, but it is evident that those schools reporting large enrollments probably are teaching more than one class.

If a teacher of agriculture is to conduct a good program his department must contain the necessary facilities. One of the facilities a department must have, if a program of farm mechanics is to be established, is that of a farm mechanics shop. It is the responsibility of the local school administrators to provide the facilities necessary to

conduct a complete program in vocational agriculture.

TABLE VIII

Schools That Have Farm Mechanics Shops

Item	Number of Cases	Per Cent
Have farm mechanics shop	132	76.0
Do not have farm mechanics shop	42	24.0
Total	174	100.0

This table reveals that one-fourth of the schools represented in this study do not have farm mechanics shops. It is evident that much remains to be done with school administrators concerning the provision of facilities for a complete program of vocational agriculture.

The size and equipment of a farm mechanics shop are important factors in the conduct of such a program. The very nature of its work makes it impossible to do desirable work in a small shop. Each of the specified areas of farm mechanics work calls for special tools. If these are not part of the shop equipment it is impossible for the teacher to include these areas in a program.

The opinions of the teachers of agriculture as to the size and equipment of the shops in which they teach are listed below.

TABLE IX

Farm Mechanics Shops That are of Adequate Size for All-Day, Young Farmer and Adult Farmer Classes, as Expressed by Teachers

Classes	Number of Departments	Per Cent of Total
All-Day	97	73.5
Young Farmer	99	75.0
Adult Farmer	96	72.7

TABLE X

Farm Mechanics Shops Equipped to Carry Out Adequately All Phases of Farm Mechanics Needed in the Community

Item	Number of Departments	Per Cent
Adequately equipped	55	41.6
Not adequately equipped	77	58.4
Total	132	100.0

A review of Tables IX and X revealed that in all cases approximately twenty-five per cent of the teachers indicated that their shops were not of adequate size for all-day, young and adult farmer classes. Less than fifty per cent of the teachers stated that their shops were adequately equipped to teach the phases of farm mechanics needed in their school communities.

The writer listed several items which are considered essential to good planning and organization in farm mechanics. The teachers were requested to check these items if they were a part of their planning and organization. These data are presented in the following table:

TABLE XI

Items Considered Essential to Good Planning and Organization in Farm Mechanics

Item	Number of Teachers	Per Cent
1. Written annual teaching plan in farm mechanics	87	66.0
2. Classes divided into work groups	114	86.4
3. All-day, young farmer and adult farmers make farm mechanics survey of home farm	58	44.0
4. Students keep an outline of completed farm mechanics jobs in a notebook	46	35.0
5. Annual teaching plan centered around boys' supervised farming program	98	74.0
6. An organized plan for issuing tools and shop cleanup	104	80.0
7. Local school administrators familiarized with the purpose of the farm mechanics phase of the vocational agriculture program	128	96.0
8. Copy of annual teaching plan in farm mechanics submitted to superintendent, supervisor and principal	37	26.0
9. Principal and supervisor assists in planning and carrying out farm mechanics program	77	58.3
10. School administrators have worked out with the teacher of vocational agriculture a long-time plan for the improvement of farm mechanics facilities	28	21.6

Data indicate that the majority of the teachers who have shops have written annual teaching plans. It is the opinion of many leaders

in farm mechanics that a shop program that is not carefully planned cannot evolve into a successful educational program.

One item that the majority of good farm mechanics instructors will agree upon is that of organizing the class into work groups. One hundred fourteen teachers surveyed replied that they employed this type of class organization. It is evident that our teachers agree in the main with this item.

Most vocational educators consider the farm survey one of the best methods for securing information about existing farm conditions when planning a teaching program in vocational agriculture. The data show that 58 or 44 per cent of the teachers with farm mechanics shops use the survey in planning their program.

The foundation of the teaching program in vocational agriculture is said to be supervised farming. If this be true the farm mechanics phase should be planned around supervised farming. These data indicate that 74 per cent of the teachers use the supervised farming programs in planning their annual teaching plan in farm mechanics.

If the pupils keep an outline of completed farm mechanics jobs in a notebook, it could serve as a valuable reference in future farming operations. Only 58 or 44 per cent of the teachers indicated that they followed this practice.

An organized plan for issuing tools and shop cleanup is essential to a well planned and organized shop. The element of time in shop work requires careful planning. Shop classes are different from other types of classes in that it is time consuming to issue tools and equipment and to get the pupils started to work on the assigned jobs. The aim of every teacher should be to so plan and organize their classes so

that the pupils will have as much project work time as possible. As indicated in Table XI, 104 of the 132 teachers having shops use an organized plan of tool issue and cleanup.

If a program is to have the full cooperation of the school administrators, such administrators must be made familiar with the aims and purposes of shop instruction. It is the responsibility of the teacher of agriculture to keep the local authorities aware of his program and what it seeks to accomplish. Table XI reveals that 128 of the teachers surveyed keep the local administrators familiar with the purpose of the farm mechanics phase of the vocational agriculture program. The above figures indicate that too many administrators at the present time do not possess an adequate working understanding of the instructional phase of farm mechanics, they should be urged to acquire such understanding as quickly as possible. Henceforth, it is the duty of the teacher of agriculture to keep such administrators informed about further developments. Data indicate that only 37 of the teachers participating submit copies of their annual teaching plans to their superintendent, supervisor and principal.

The teacher of agriculture cannot plan and conduct the agriculture program alone. He must have the cooperation of his principal and supervisor. These people will be much more willing to support and aid the program if they are asked to participate in the planning stage. According to data in Table XI, 77 teachers secure the assistance of the principal and supervisor in planning their programs.

The agriculture picture changes very rapidly. When a department of vocational agriculture is established, it might have the facilities necessary to teach a complete program at that time, however, there must exist a long-time plan for improvement if the facilities

remain adequate. Only 28 of the teachers surveyed indicate that a long-time plan for improvement of their department has been worked out.

Today, farm mechanics instruction includes the following areas: Farm shop, Farm power and machinery, Farm electricity, Soil and water management and Farm carpentry and buildings. Each teacher was asked to indicate the areas included in his program.

TABLE XII

Farm Mechanics Areas Included in Teaching Programs

Area	Number of Programs	Per Cent
Farm shop	126	95.4
Farm power and machinery	87	66.0
Farm electricity	118	89.4
Soil and water management	71	54.0
Farm carpentry and buildings	127	96.0

It is revealed that all of the specified areas of farm mechanics are being taught in the majority of the schools represented in this study. Data indicate that we must strengthen the farm power and machinery and soil and water management areas.

One of the difficulties encountered by teachers of agriculture in conducting a farm mechanics program is that of the amount of time to allot to this phase of the work. The distribution of day class time to farm mechanics instruction is revealed in Table XIII.

TABLE XIII

Distribution of Day Class Time to Farm Mechanics

Time	Number of Cases	Per Cent
1/4 of class time	79	59.8
1/3 of class time	43	32.6
1/2 of class time	8	6.0
Other	2	1.6
Total	132	100.0

It is shown that the majority of the teachers allot one-fourth of the all-day class time to farm mechanics instruction. The above data fall within the limits of the general recommendations as to the time that should be alloted this phase. The class time recommended by many is one-fourth to one-third depending on the type of farming in the area, however, there are some who recommend that one-half of the total class time be devoted to farm mechanics.

TABLE XIV

Schedule Plans for Departments of Vocational Agriculture

Plan	Number of Cases	Per Cent
Plan "A"	19	14.4
Plan "B"	3	2.3
Plan "C"	1	0.8
Plan "D"	109	82.5
Total	132	100.0

It is disclosed that the majority of the schools represented employ schedule "D" in the operation of their vocational agriculture classes. Administrators favor this schedule because the majority of classes in the school operate on a 60 minute period. The vocational agriculture teacher is handicapped in farm mechanics instruction when this schedule is used. Data indicate that the teacher must plan extremely carefully if his pupils in farm mechanics classes accomplish their goal under the schedule employed. Sixty minutes is a very short time in which to try to issue tools, demonstrate jobs, supervise individual work and clean the shop.

The teachers were asked to state if they were reared on a farm. These data are presented below.

TABLE XV

Vocational Agriculture Teachers Reared on A Farm

Item	Total Number of Teachers	Per Cent	Teachers Conducting Farm Mechanics Programs	Per Cent
Reared on a farm	161	93.1	126	95.4
Not reared on a farm	9	5.2	6	4.6
No reply	4	1.7	0	0.0
Total	174	100.0	132	100.0

Data in Table XV reveal that the greater percentage of teachers were reared on a farm.

The teachers were also requested to list the type of farming followed on their home farms.

TABLE XVI

Type of Farming Practiced on Home Farms of Teachers of Vocational Agriculture

Type of Farming	Total Number of Teachers	Per Cent	Teachers Conducting A Farm Mechanics Program	Per Cent
General	119	68.5	94	71.1
Cotton	19	10.9	13	9.8
Sugar Cane	4	2.3	3	2.3
Dairy	6	3.5	5	3.8
Rice	4	2.3	2	1.6
Truck	3	1.7	2	1.6
Livestock	3	1.7	3	2.3
No reply	16	9.1	10	7.5
Total	174	100.0	132	100.0

These data in Table XVI show that a very large percentage of the total number of teachers participating in this study were reared on farms practicing a general type of farming. Next in order is cotton farming with dairy, sugar cane, rice, truck, and livestock following.

The teachers were asked to furnish data concerning the type of farm equipment used on their home farms. The purpose of this was to determine what type of equipment the teachers might have learned to operate while at home.

TABLE XVII

Type of Farm Equipment Used on
Home Farms of Teachers of Agriculture

Type of Equipment	Total Number of Teachers	Per Cent	Teachers Conducting Farm Mechanics Programs	Per Cent
Tractor and tractor drawn equipment	14	8.0	12	09.0
Horse drawn equipment	117	67.2	84	63.7
Both types of equipment	30	17.2	30	22.7
No reply	13	7.6	6	4.6
Total	174	100.0	132	100.0

It is evident that the majority of the teachers were reared on farms using horse drawn equipment. This type of equipment required a different type of farm mechanics than that which our teachers are called on to teach today. These data indicate that teachers of agriculture had to receive their training for mechanized farming away from the home farm.

The teachers were also asked to list the farm mechanics activities they participated in on the home farm.

TABLE XVIII

Farm Mechanics Activities
Teachers Participated in on the Home Farm

Activity	Total Number Of Teachers	Per Cent	Teachers Conducting Farm Mechanics Programs	Per Cent
Operating tractor and tractor drawn equipment	14	08.0	12	09.0
Operating horse drawn equipment	147	84.5	101	76.5
Servicing and repairing farm automobile or truck	67	38.5	60	45.5
Servicing equipment on the home farm	112	64.4	102	77.0
General farm shop work	62	35.6	57	43.2
Farm electricity	57	32.8	46	35.6
Soil and water management	82	47.0	73	55.0
Farm carpentry	109	61.1	89	67.0

Data indicate that very few of the present teachers of agriculture had the opportunity to operate a tractor and tractor drawn equipment on their home farm. The indications are that the majority of the teachers probably left the home farm before the accelerated advance of tractor power on the farms in Louisiana. Operating horse drawn equipment, servicing equipment, farm carpentry, and soil and water management were the activities participated in by the majority of the teachers. It is shown that many of the teachers may have left the farm before electric lines pushed their way into rural Louisiana. General farm shop work appears to have been neglected on the home farms of present teachers of vocational agriculture.

The teachers were requested to state whether they had taken vocational agriculture in high school. They were also requested to state the number of years they had pursued the vocational agriculture curriculum.

TABLE XIX

Teachers Who Took Vocational Agriculture in High School

Years	All Teachers	Per Cent	Teachers Who Are Conducting a Farm Mechanics Program	Per Cent
One year	12	07.0	9	6.9
Two years	9	05.2	9	6.9
Three years	13	07.4	10	7.4
Four years	59	34.0	48	36.4
None	70	40.2	53	40.0
No reply	11	6.2	3	2.3
Total	174	100.0	132	100.0

It is revealed that approximately one-third of the teachers took four years of vocational agriculture in high school. Approximately one-fourth took from one to three years. These data indicate that 93 of the total number of teachers cooperating in this study were pupils of vocational agriculture in high school. It is probable that many of our teachers may have graduated before a department of agriculture was established in the high schools they attended.

The writer considered next the number of departments attended by present teachers of vocational agriculture that had farm mechanics shops.

TABLE XX

Departments That Had Farm Mechanics Shops

Departments	All Teachers	Per Cent	Teachers Conducting Farm Mechanics Programs	Per Cent
Departments that had shops	38	41.0	32	42.1
Did not have shops	45	48.3	44	57.9
No reply	10	10.7	0	0.0
Total	93	100.0	76	100.0

It is shown that less than half of the departments attended by present teachers of agriculture had farm mechanics facilities. These figures indicate that in years past teachers of agriculture and school administrators must have felt that the farm mechanics phase of the vocational agriculture program was of little importance.

To get an idea of the equipment in the farm mechanics shops where teachers of agriculture received high school training, each teacher was asked to designate the areas of farm mechanics the shops were equipped to teach.

TABLE XXI

Areas of Farm Mechanics, Shops Were Equipped to Teach

Area	All Shops	Per Cent	Shops Attended by Teachers Conducting Farm Mechanics Programs	Per Cent
Farm shop	34	89.5	28	87.5
Farm carpentry	38	100.0	31	97.0
Farm power and machinery	12	31.6	10	31.2
Farm electricity	13	34.2	11	34.4
Soil and water management	28	73.7	21	65.6

These data reveal that farm carpentry, farm shop and soil and water management were the areas that most of the shops were equipped to teach. These data place emphasis on a problem that has existed for many years in farm mechanics instruction. Supervisors and teacher trainers have been alarmed that the primary emphasis in farm mechanics instruction was that of woodworking. Figures listed above would seem to indicate this emphasis to be true.

Next in order the writer requested information concerning the time spent in farm mechanics instruction in those departments attended by the teachers of vocational agriculture.

TABLE XXII

Time Spent in Farm Mechanics Instruction in Department Teachers Attended

Time	All Departments	Per Cent	Departments Attended by Teachers Conducting Farm Mechanics Programs	Per Cent
1/4 of class time	34	89.5	27	84.4
1/3 of class time	3	08.0	5	14.6
1/2 of class time	1	02.5	0	00.0
Total	38	100.0	32	100.0

It is evident that most of the teachers of agriculture teaching in the departments attended by the teachers participating in this study considered one-fourth of the class time adequate for farm mechanics instruction.

To determine the farm mechanics training received by the teachers participating in this study while in high school, each teacher was asked to check each area of training received.

TABLE XXIII

High School Farm Mechanics Training
Received by Teachers of Agriculture

Area	All Teachers	Teachers Conducting Farm Mechanics Programs
Farm Shop		
(a) Woodworking	38	32
(b) Tool conditioning	30	26
(c) Farm plumbing	13	13
(d) Soldering and sheet metal	19	16
(e) Hot and cold metal work	20	20
(f) Concrete	17	15
(g) Welding		
1. Electric Arc	5	3
2. Acetyelene	3	1
Farm Power and Machinery		
(a) Tractor operation	8	7
(b) Tractor maintenance and minor repair	11	9
(c) Tractor selection	7	6
(d) Farm equipment maintenance and repair	14	14
(e) Farm equipment operation	10	10
(f) Farm equipment selection	7	5
(g) Cost of using farm tractor and equipment	6	6
Farm Carpentry and Building		
(a) Proper care and use of hand tools	38	32
(b) Draw simple plans for projects	34	26
(c) Read simple blueprints	22	15
(d) Figure bill of materials	35	26
(e) Layout and cut common rafters	23	16
(f) Stake out foundation	20	15
(g) Construction of small structures	21	17
(h) Building maintenance	21	17
Farm Electricity		
(a) Understanding electrical terms	14	12
(b) How to select wiring materials for a given use	8	5
(c) How to run a parallel circuit	4	4
(d) How to install a wall receptable	8	8
(e) How to install a light switch	6	6

TABLE XXIII (CON'T.)

Area	All Teachers	Teachers Conducting Farm Mechanics Programs
(f) How to install a ceiling light	5	5
(g) How to plan an electrical system for the farmstead	5	5
(h) How to install a three-way switch	3	3
(i) Fuzes and their function	7	7
(j) Use and care of electrical motors	4	4
(k) Installing electric fences	5	4
Soil and Water Management		
(a) How to layout, run, construct and maintain terraces	26	22
(b) How to run contour lines	22	17
(c) How to layout a field for drainage	21	16
(d) Different types of drainage systems	19	14
(e) Locate drainage ditches for a field	19	15
(f) Lay drain tile	6	5
(g) How to layout a field for sprinkler irrigation	4	2

These data reveal that in the farm shop area primary emphasis was placed on woodworking and tool conditioning. Hot and cold metal work appears in approximately fifty per cent of the cases. It is apparent that welding was not considered an important item at this time.

It is indicated that a small number of the present teachers of vocational agriculture received high school farm mechanics training in the farm power and machinery area. It is probably true that very few, if any, tractors and tractor drawn equipment were in the school community at the time many of our teachers attended high school. At the same time we know that horse drawn equipment was used and should have been included in the shop program of each school represented.

Data reveal that the majority of the teachers received training in the farm carpentry and buildings area. It is indicated that training received in this area was in excess of the other areas.

A review of the farm electricity area reveals that a small percentage of the teachers received electrical training. It is possible that electrical lines had not been extended to many rural areas at this time.

A summary of the soil and water management area shows that a large percentage of the teachers received training in various phases of this area. It must be stated at this time that all of the teachers would not need instruction in every item listed under this area. The type of instruction provided in soil and water management would depend on the section of the state in which the community was located and the type of soil.

The opinions of teachers as to whether high school farm mechanics training proved beneficial in planning and conducting their own farm mechanics program are listed in Table XXIV.

TABLE XXIV

Opinions of Teachers as to Whether High School Farm Mechanics Training Proved Beneficial in Planning and Conducting Their Own Farm Mechanics Program

Opinion	Number of Teachers	Per Cent
Excellent	3	09.0
Good	8	25.0
Fair	15	47.0
Poor	6	19.0
Total	32	100.0

A summary of Table XXIV shows that only three of the teachers considered their high school farm mechanics training as an excellent factor in assisting them in the planning and conduct of their own program. It is possible that the rapidity of change in farm mechanics is probably one of the primary reasons why fair and poor ratings were given by 66 per cent of the teachers surveyed.

A teacher's training is perhaps the leading factor affecting the teaching of a subject. If the teacher is to be confident and enthusiastic in his teaching he must be well trained. The undergraduate training received by the teachers cooperating in this study is presented below.

TABLE XXV

Farm Mechanics Courses in Undergraduate Curriculum

Course	All Teachers	Per Cent	Teachers Conducting Farm Mechanics Programs	Per Cent
Farm shop mechanics	155	90.0	120	90.9
Methods in farm mechanics	47	27.0	38	28.8
Land drainage and terracing	135	77.6	109	82.6
Farm power	48	27.6	40	30.6
Farm machinery management	60	34.5	47	36.0
No reply	13	07.5	5	04.0

A study of the above table indicates that the largest per cent of the teachers received training in farm shop mechanics and land drainage and terracing. It is evident that unless many of the teachers received training in the other specified areas of farm mechanics prior to their college training or have taken graduate and in-service training they are handicapped in teaching many needed jobs.

The teachers were also requested to list the graduate training received in farm mechanics. The following table deals with graduate courses in farm mechanics.

TABLE XXVI

Graduate Courses in Farm Mechanics

Courses	All Teachers	Per Cent	Teachers Conducting Farm Mechanics Programs	Per Cent
Farm electricity	12	07.0	10	07.5
Farm mechanics	11	06.4	9	07.0
Welding	2	01.1	2	01.5
Metal work	1	00.6	1	00.7
Pipe fitting	1	00.6	1	00.7
Tool fitting	1	00.6	1	00.7
Improving apprentice teaching	1	00.6	1	00.7

These data indicate that the teachers who are conducting farm mechanics programs are the ones who have taken graduate courses in farm mechanics. Data further indicate that many teachers enrolled for advance degrees did not take advanced farm mechanics work. Table III, listed earlier in this chapter, indicated that 94 of the 179 teachers participating in this study had acquired advanced degrees.

During the past five years several series of in-service training classes in farm mechanics have been conducted for the teachers of vocational agriculture in Louisiana. These classes were in the areas of farm mechanics requested by the teachers in the various supervisory districts. The teachers taking part in this study were requested to state how many of these workshops they had attended.

TABLE XXVII

Teachers Attending In-Service Training Workshops Conducted on Area and State Basis

Attendance	All Teachers	Per Cent	Teachers Conducting Farm Mechanics Programs	Per Cent
All	41	23.6	26	19.0
Some	90	51.7	88	67.0
None	25	14.4	18	14.0
No reply	18	10.3	0	0.0
Total	174	100.0	132	100.0

These data show that the in-service training workshops were not well attended by the teachers. The workshops were planned so that the teachers would not have a long distance to drive and at hours that would not interfere with regular school work. The local school administrators were consulted and asked to authorize the teachers to attend.

The teachers were also requested to rate the in-service training classes on the basis of excellent, good, fair and poor. The teachers' ratings are given in the following table.

TABLE XXVIII

Teachers' Opinions of In-Service Training Classes in Farm Mechanics

Opinion	All Teachers	Per Cent	Teachers Conducting Farm Mechanics Programs	Per Cent
Excellent	50	38.1	40	35.0
Good	41	31.3	42	37.0
Fair	40	30.6	32	28.0
Poor	0	0.0	0	0.0
Total	131	100.0	114	100.0

It is evident that the teachers were not too well pleased with the in-service training classes. The above would seem to indicate a need for more careful planning with the teachers concerning needs for training, training centers and the time classes are held.

The writer requested information concerning the use of technical personnel from the university, state colleges and commercial companies in their farm mechanics instructional program.

TABLE XXIX

Teachers Using Technical Personnel From University, State Colleges, and Commercial Companies to Assist With Instruction in Farm Mechanics

Activity	Number of Teachers	Per Cent
Do use them	37	28.0
Do not use them	95	72.0
Total	132	100.0

It is evident that this practice has not been utilized by the majority of the teachers. It is probable that many of the teachers consider their school too far away from the university, or a state college to request the assistance of technical personnel. It is also probable that they are overlooking technical personnel from commercial companies who are near their school and hold their position for the express purpose of aiding prospective customers and school personnel with their problems.

The teachers were asked to submit an outline of the farm mechanics jobs taught to their all-day classes for the year 1956-57. The following provides this information.

TABLE XXX

Farm Mechanics Jobs Taught to All-Day Pupils

Area	Grade			
	9th	10th	11th	12th
Farm Shop				
Tool Conditioning				
Fitting hand tools	13	22	10	8
Grind an ax	9	8	6	11
Saw filing	10	10	11	13
Use and care of power grinder	2	0	0	0
Care of tools	11	0	0	0
Grind a drill bit	6	9	4	0
Sharpen cold chisel	8	10	4	6
Sharpen and adjust plane iron	1	4	4	0
Grind mowing machine blade	0	0	0	2
Sharpen auger bit	0	4	3	6
Welding				
Electric Arc welding	14	27	29	31
Farm welding	11	11	19	20
Oxyacetylene welding	6	15	21	29
Soldering	20	29	12	11
Solder a patch	8	0	0	0
Make a funnel	6	0	0	0
Operate a blow torch	10	2	0	0
Tinning a soldering copper	6	3	0	0
Solder a small pan	3	0	0	0
Woodworking	7	6	9	9
Tools and uses	40	29	3	3
End tables	0	13	0	0
Broom holder	16	4	0	0
Coffee tables	0	11	9	0
Telephone tables	0	0	10	8
Drawing simple plans	10	4	3	1
Bench hook	11	8	2	2
Build mail box	13	0	0	0
Learn to use handsaw	11	0	0	0
Learn to use jigsaw	13	0	0	0
Operate wood lathe	15	0	0	0
Elementary woodwork	3	3	3	3
Use and care of proper tools	12	14	16	23
Build a square box	2	2	0	0
Construct ash tray stand	2	4	2	2
Construct tool box	0	6	0	0
Sanding	11	11	11	11
Construct miter box	3	4	0	0
Bread box	5	3	1	1
Finishing wood	13	16	16	19
Lawn bench	12	14	14	9

TABLE XXX (CON'T.)

Area	Grade 9th	10th	11th	12th
Rope Work	24	21	8	6
Rope halters	12	2	2	0
Rope splices	2	2	4	2
Glazing	20	18	16	15
Concrete Work	6	13	19	17
Blacksmithing	3	8	2	1
Build forge fire	6	2	0	0
Bending, tempering and annealing metal	2	2	2	2
Types and uses of metals	4	2	1	1
Make gate hook	0	0	2	2
Establishing a farm shop	2	4	2	2
Shop Safety	14	13	12	9
Cold Metal Work				
Cutting with cold chisel	4	4	2	2
Use of hacksaw	2	0	0	0
Operate a drill press	11	0	0	0
Farm Safety	12	0	0	0
Hot Metal Work	5	6	9	8
Plumbing	8	27	31	32
Measuring, cutting and threading pipe	0	2	7	2
Septic Tanks	0	0	2	0
Layout Drain Fields	0	3	3	3
Disposal Fields	0	1	0	0
Sheet Metal Work				
Riveting	0	3	3	0
Construct metal tool box	0	0	2	0
Fence Construction	2	0	0	0
Farm Electrification				
Electrical terms and fundamentals	12	11	19	16
Simple wiring	6	9	16	19
Electric wire splices	6	2	4	4

TABLE XXX (CON'T.)

Area	Grade 9th	10th	11th	12th
Make and repair extension cords	4	1	2	2
Using electricity safely	2	0	0	0
Planning electrical wiring	0	0	6	8
Water pumps and water systems	0	0	4	2
Wire sizes and carrying capacities	6	6	6	3
How electric power is wasted due to wire size and length	0	3	3	0
Fuzes and circuit breakers	6	3	6	3
Care of electrical equipment	0	0	2	2
Install door bell	0	0	2	2
Install switch outlet	0	0	8	9
Electric motors	0	6	17	17
Read electric meter and figure electric bill	3	3	3	9
Uses of electricity	0	4	3	6
Electrical equipment	0	0	6	9
Wiring materials and uses	0	0	7	0
Electric circuits	0	0	0	5
Installing wall switch	0	0	0	9
Installing 3-way switch	0	0	0	2
Install electric light	0	6	4	1
Install circuit breaker box	0	0	0	1
Farm electricity	9	11	22	22
Farm Carpentry and Buildings	0	2	0	0
Rafter cutting	4	19	22	14
Layout foundations	2	2	9	12
Figuring bills of materials	6	6	9	11
Laying out and marking lumber	15	0	0	0
Constructing saw horse	4	6	8	2
Framing a building	0	0	0	4
Constructing self feeders	0	7	8	2
Portable cattle chute	0	0	4	6
Layout and cut door steps	3	7	9	9
Screening windows	0	2	2	0
Gate construction	0	0	0	2
Constructing cattle gap	3	0	0	1
Door frames	0	2	0	1
Construct a brooder	0	0	7	5
Construct a hay rack	0	0	0	0
Construct swine self feeders	0	3	0	0
Poultry water stand	0	5	2	1
Construct feed supply box	0	0	2	0
Figuring board feet	0	0	0	2
General farm carpentry	9	15	19	27

TABLE XXX (CON'T.)

Area	Grade 9th	10th	11th	12th
Farm Power and Machinery				
Farm machinery repair and maintenance	7	10	19	22
Constructing a tractor blade	0	1	0	0
Building a cultipacker	0	2	2	0
Tractor maintenance	3	14	23	26
Repair of small motors	0	7	9	12
Selecting of farm equipment	0	7	9	12
Care of mowing machine	0	3	5	2
Care and adjustment of spark plugs	0	0	2	2
Equipment storage	1	0	0	0
Changing points in tractor	0	0	3	0
Adjusting tractor brakes	0	0	2	0
Cost of tractor operation	0	3	4	0
Grind mowing machine blades	0	5	3	3
Repair a disc	0	0	3	0
Care and maintenance of farm equipment	9	7	11	11
Repair planter	0	0	2	2
Repair harrow	0	0	0	1
Repair fertilizer distributor	0	0	0	1
Installation of equipment	0	0	0	1
Maintain lawn mower	0	2	0	0
Principles of gas engines	0	2	2	2
Constructing farm equipment	0	0	6	0
Tune tractor	0	0	5	0
Soil and Water Management				
Layout drainage ditch	2	0	2	2
Measuring land	0	0	2	0
Soil and water conservation	0	0	2	0
Irrigation and drainage	0	0	4	6
Use of farm level	0	9	11	0
Land leveling	0	1	0	0
Land drainage	0	3	0	0
Running terraces	4	6	16	18
Field drainage	2	2	2	2
Soil and water management	4	3	6	6

The above table presents an interesting state-wide picture of the farm mechanics taught to all-day classes last year. Data indicate

a broad coverage of the farm shop area, however, this is as it should be because farm shop is the foundation for the other areas of farm mechanics. As we review the farm shop area we note that the primary emphasis was given to woodworking, welding and farm plumbing. Many leaders in farm mechanics infer that many times certain phases of farm mechanics receive less emphasis because of the popularity of certain other phases. The above data would seem to indicate that this may be true in our program in Louisiana.

In the farm electrification area it is noted that farm electricity, electrical terms and fundamentals, simple wiring and electric motors were the phases most frequently included in the programs. It is evident that many schools are not including instruction in farm electricity.

These data also indicate that farm carpentry and buildings did not receive the emphasis that might have been expected. We note that general farm carpentry was checked by the largest number of teachers. It must be stated at this time that many jobs are involved when we consider general farm carpentry. It is probable that for the sake of brevity that many of the teachers simply listed general farm carpentry rather than list the many jobs involved.

It is evident that tractor maintenance, farm machinery repair and maintenance, care of mowing machine and repair of small motors were the phases most generally emphasized in the farm power and machinery area. It is also evident that many schools are not including instruction in the farm power and machinery area.

It is noted that soil and water management did not receive the emphasis that would be desirable in a good program of farm mechanics.

The conservation and management of the soil is an important factor in the success of any farm enterprise and is always a problem of paramount importance to the farmer.

The writer wishes to state at this time that the jobs listed under the various areas presented in the above table are as listed by the teachers. It is realized that overlapping of jobs and repetition does exist but it was considered desirable for the purposes of this study to present them as listed.

The teachers were also asked to indicate the farm mechanics jobs taught to adult and young farmers. These jobs are as follows:

TABLE XXXI

Farm Mechanics Jobs Taught to Young and Adult Farmers

Area	Young Farmers	Adult Farmers
Farm Shop		
Welding		
Construct metal gate by welding	0	1
Arc welding	17	24
Oxyacetylene	14	17
Welding	10	11
Soldering	5	8
Hand Woodworking	5	8
Use of hand tools	1	0
Care and storage of tools	1	0
Furniture building	0	0
Hand tool use and care	2	1
Leathercraft	2	4
Painting	0	1
Farm Safety	2	4
Tool Sharpening	0	1
Sheet Metal Work	1	2
Plumbing	8	11
Tool Conditioning	2	2
Glazing	1	1
Blacksmithing	0	1
Rope Work	1	0
Concrete Work	4	5
Saw Filing	1	1
Hot and Cold Metal Work	1	0
Farm Carpentry		
Farm buildings	1	1
Farm carpentry	8	8
Farm gates	1	0
Constructing farm wagon	1	1

TABLE XXXI (CON'T.)

Area	Young Farmers	Adult Farmers
Layout building foundations	0	1
Blue print reading	0	1
Farm carpentry	1	1
Build truck bed	0	1
Build chicken brooder	1	0
Rafter cutting	1	1
Cutting doorsteps	1	0
Farm Power and Machinery		
Repair of farm equipment	7	9
Tractor maintenance and repair	15	13
Construction of farm machinery	1	1
Small motors	0	1
Operation and use of farm machinery	1	1
Painting tractors	1	1
Types of farm machinery	1	1
Gas engines	1	3
Farm Electricity		
Farm electricity	4	5
Wiring farm buildings	0	1
Uses of farm electricity	1	1
Electrical fundamentals	2	2
Wire and fuzes	1	1
Switches	1	1
Circuits	1	1
Electric motors	1	2
Soil and Water Management		
Terracing	0	1
Irrigation	1	1
Soil and water conservation	1	1

Table XXXI shows that farm mechanics instruction to adult and young farmers consisted primarily of welding. The writer is cognizant of the fact that welding is important to the farmer, but it is disturbing that the other areas are probably more important, yet they are taught by few teachers. It is very evident that very few adult and young farmers are receiving instruction in the farm mechanics phase.

The principals were asked to list the number of years they had served as principals. The purpose of this question was to determine how many years the principals who cooperated in this study had served as principals. These data are listed below:

TABLE XXXII

Number of Years Tenure as A High School Principal

Years	Number of Cases	Per Cent
1 - 5	51	32.5
6 - 10	30	19.1
11 - 15	23	14.7
16 - 20	17	10.8
21 - 25	18	11.5
26 - 30	6	3.8
31 - 35	11	7.0
Over 35	1	0.6
Total	157	100.0

The number of years tenure as a principal of those cooperating in this study ranged from one to over 35 years.

To determine the tenure of the principals in their present positions, each principal represented in this study was requested to state the number of years that he had served the school where he is now located. The purpose of this was to determine if the principals remained at one school for a very long period. This is brought out in the following table.

TABLE XXXIII

Tenure of Principals in the Present Schools

Years	Number of Cases	Per Cent
1 - 5	60	38.2
6 - 10	36	22.9
11 - 15	29	18.5
16 - 20	15	9.6
21 - 25	8	5.0
26 - 30	4	2.6
31 - 35	4	2.6
Over 35	1	0.6
Total	157	100.0

The revelations are that the largest percentage of the principals have a tenure at the present school of one to five years. The principals surveyed have a tenure at the same school ranging from one to over 35 years.

Since this study deals exclusively with the farm mechanics phases of the vocational agriculture program the principals were asked if their departments had shops. This information is tabulated in Table XXXIV.

TABLE XXXIV

Departments of Vocational
Agriculture Having Farm Mechanics Shops

Item	Number of Departments	Per Cent
Departments having shops	135	86.0
Departments not having shops	22	14.0
Total	157	100.0

The indications are that 135 of the 157 schools represented by principals have farm mechanics shops. The remaining data secured from principals will be taken from the replies of those indicating a farm mechanics shop.

In order to determine the length of time the various schools have had farm mechanics facilities, a question concerning this factor was included in the questionnaire.

TABLE XXXV

Number of Years Departments Have Had Shops

Years	Number of Departments	Per Cent
1 - 5	41	30.3
6 - 10	42	31.1
11 - 15	26	19.3
16 - 20	20	14.8
21 - 25	6	04.5
Total	135	100.0

A review of the above indicates that the majority of the schools have acquired shops in the last ten years. It is further indicated that shops were probably constructed as the need for farm mechanics instruction became greater. These data indicate a desirable trend in acquiring farm mechanics facilities.

The principals were asked to indicate if the shop had been constructed at his school during his tenure as principal. It was assumed that, if the principal participated in the planning and construction of the shop, he approved of this phase of the vocational agriculture program and was aware of the purposes and importance of this phase of training.

TABLE XXXVI

Shops That Were Constructed
During Principal's Tenure at Present School

Item	Number of Schools	Per Cent
Shops constructed during principal's tenure	66	49.0
Shops constructed prior to principal's tenure	69	51.0
Total	135	100.0

The above reveals that 49 per cent of the shops involved in this study were constructed during the present principal's tenure at the school. These data indicate that the principals are interested in providing adequate facilities for a complete program of vocational agriculture.

The location of farm mechanics facilities in relation to the agriculture classroom and the other classrooms of the school has

considerable influence on the farm mechanics activities. If the shop is located in the main building, the other teachers are handicapped because of the excessive noise created by shop work. On the other hand, if the shop is located in a separate building, the teacher is handicapped to the extent of the amount of time lost in transferring class activities from the classroom to the shop.

TABLE XXXVII

Location of Vocational Agriculture Facilities

Location	Number of Departments	Per Cent
Classroom and shop adjacent, located in high school building	10	07.4
Classroom and shop separate but located away from main building	4	03.0
Classroom located in main building and shop located in a separate building	36	26.6
Classroom and shop adjacent in a separate vocational agriculture building	85	63.0
Total	135	100.0

Data in Table XXXVII disclose that 63 per cent of the departments involved in this study are housed in a vocational agriculture building. This indicates careful and wise planning of facilities on the part of the teachers and administrators.

The principal is the administrator of the local school and as such is responsible for the acquiring of and maintaining facilities adequate for the educational needs of the school community. The

principals cooperating in this study expressed their opinion of the adequacy of the farm mechanics facilities.

TABLE XXXVIII

Principals Who Consider Their Farm Mechanics Shop Adequate

Class	Number of Shops	Per Cent of Total
All-day	98	72.6
Young farmer	70	52.1
Adult farmer	65	40.7

It is interesting to note that in the opinions of the principals the farm shops are more adequate for instruction to all-day classes than for young and adult farmers. It would seem that the same facilities would be required for each of the three groups. These data further indicate that there exists in this state a definite need for the improvement of farm mechanics facilities.

For several years there has been considerable discussion and criticisms of the farm mechanics program for the non-farm mechanics activities included in the instruction. The principals submit the following list of non-farm mechanics activities included in programs conducted in their school:

TABLE XXXIX

Non-Farm Mechanics Activities
Included in Farm Mechanics Classes

Activity	Number of Cases	Per Cent of Total
Furniture construction	58	43.0
Model airplanes	2	01.5
Fancy leather work	3	02.2
Bird houses	23	17.0
Repair jobs on students' own automobiles	48	35.6
Lamps	33	24.4
Others	74	54.8

The indications are that many non-farm mechanics activities are included in farm mechanics instruction in Louisiana. It would appear that the above mentioned criticisms are justified and that all connected with the vocational agriculture program have a job to do in helping to eliminate the undesirable features of the farm mechanics phase of our program. It is true that the items listed in th above table are good shop training activities, but do not have a place in a farm mechanics training program. Time devoted to these activities could well be used in added essential farm mechanics activities.

Early in this chapter the teachers were asked if they submitted a written annual teaching plan to the principal of the school. Due to the fact that the principals and teachers participating in this study may be from different schools the principals were asked to indicate

whether they did or did not receive a written annual teaching plan from the teacher of agriculture.

TABLE XL

Number of Teachers of Agriculture Who Submit A Written Annual Teaching Plan to the Principal

Item	Number of Teachers	Per Cent
Submit written annual teaching plan	77	57.0
Do not submit plan	58	43.0
Total	135	100.0

The above information reveals that a majority of the teachers submit written annual teaching plans to the principals. It would seem apparent that many principals do not request a teaching plan or do not feel that a copy of the plan would serve any useful purpose.

The teachers were also requested to indicate if they had a long-time plan for improvement of farm mechanics facilities and program worked out with the local school administrators. The writer also asked the principals if they had participated in the formulation of a long-time plan of improvement.

TABLE XLI

Number of Principals and Teachers Having A Long-Time Plan for Improving Farm Mechanics Facilities and Program

Item	Number of Cases	Per Cent
Have long-time plan	72	53.3
Do not have long-time plan	63	46.7
Total	135	100.0

It is to be noted that many of the principals and teachers do not have a long-time plan for the improvement of farm mechanics facilities and program.

To determine whether it was a general practice in Louisiana for the principal to hold regularly scheduled meetings with the teacher of vocational agriculture they were requested to designate how often meetings were held.

TABLE XLII

Number of Principals Who Meet Regularly With Teachers to Discuss Problems

Meetings	Number of Cases	Per Cent
Once a month	42	31.1
Quarterly	13	09.6
Semi Annually	7	05.2
Annually	6	04.4
As need arises	60	44.5
Do not meet	7	05.2
Total	135	100.0

It is apparent that the largest group of principals meet with the teacher of agriculture as the need arises. Once a month, quarterly, semi annually and annually follow in order.

It is generally agreed that a functioning advisory council is a good aid in a program of vocational agriculture. The principals cooperating in this study were requested to state their opinion of the use of an advisory council.

TABLE XLIII

Principals' Opinions of Advisory Councils in A Program of Vocational Agriculture

Opinion	Number of Cases	Per Cent
Excellent	24	17.8
Good	61	45.1
Fair	35	25.9
Poor	8	06.0
Of no value	7	05.2
Total	135	100.0

Principals are divided in their opinions of advisory councils. It is entirely possible that many of the principals have never seen a functioning advisory council at work. It is indicated that our advisory councils should be strengthened.

The teacher of agriculture has many duties and responsibilities away from the school. The State Board of Education has stated the policy that a teacher of agriculture's schedule be such that it not

interfere with the supervision of supervised farming programs and other activities connected with the program of vocational agriculture. The principals were asked to indicate the special assignments given to teachers of agriculture.

TABLE XLIV

Other Special Assignments to Teachers in Addition to Vocational Agriculture

Activity	Number of Cases	Per Cent of Total
Physical education	30	22.2
School transportation	7	05.2
Debate team	4	03.0
School paper	1	00.7
School movies	9	06.7
School contests	22	16.3
School elections	10	07.4
School fairs and exhibits	80	60.0
Coaching athletics	5	03.7
Others		
Study hall	8	06.0
Safety club	1	00.7
4-H Club	4	03.0

Teachers of agriculture are given many special assignments in addition to their regular teaching duties. The desirable schedule for a teacher of vocational agriculture would release him for the greater part of the afternoon for the supervision of supervised farming programs. The writer does not infer that the teacher of agriculture

should not be given special assignments. He is a member of the high school faculty and as such should bear his just share of extra assignments that are necessary for the operation of the school. The writer does imply that the vocational agriculture teacher's assignments should be carefully determined so that his responsibilities as an agriculture teacher will not be curtailed.

Another controversy existing in the vocational agriculture program is that of the assignment of teachers to teach subjects other than agriculture. The State Board of Education policy states that an agriculture teacher must devote four-fifths of his time to the teaching of vocational agriculture if the department is to meet minimum requirements. The contention is that a teacher must devote four-fifths of his time to vocational agriculture if he is to conduct a complete program. Ideally a teacher should devote 100 per cent of his time to agriculture. It is understood that in small schools the teacher of vocational agriculture must at times accept subject assignments in other fields to enable the school to offer the needed educational program.

TABLE XLV

Number of Subjects Other Than Agriculture Taught by Teachers

Subject	Number of Cases	Per Cent
General Science	29	21.5
English	0	00.0
Civics	3	02.2
Biology	20	14.8
Chemistry	5	03.7
Mathematics	8	06.0
History	3	02.2
Geography	1	00.7
Others		
8th Grade Science	10	07.4

Many teachers of agriculture teach science, social study courses and mathematics. Indications are that many of such teachers are being so heavily loaded with other subjects that the time needed for planning and conducting a farm mechanics program is curtailed. It is the responsibility of the principal to work out with the teacher of agriculture a desirable teaching schedule. It is also the responsibility of the teacher of agriculture to make his program of agriculture so vital that the assignment of other subjects would not be a question.

Farm mechanics is an expensive phase of the vocational agriculture program. It requires expensive equipment and expensive instructional materials. Many teachers have great difficulty in securing the necessary materials needed. The writer is aware that many different methods are used in securing such materials. Plans employed in the

schools of principals cooperating in this study are listed below.

TABLE XLVI

Methods Used for Securing
Instructional Materials for Farm Mechanics

Plan	Number of Cases	Per Cent of Total
Furnished by local school board	107	80.0
Furnished from local school fund	5	03.7
Furnished by students	12	09.0
Purchased by FFA Chapter and sold to individual students	11	08.0
Partly furnished by school board and partly furnished by students	19	14.0

Five different plans for securing farm mechanics instructional materials in Louisiana schools are listed above. Materials furnished by the local school board is employed by the majority of schools participating in this study. It is the opinion of the writer that it is the responsibility of the school board to furnish instructional materials, however, if the student is to carry the project home for his own use he should reimburse the cost of materials.

The principals were requested to state their policy concerning the selection of high school boys who take vocational agriculture. Table XLVII deals with farm home background of boys enrolled in vocational agriculture classes.

TABLE XLVII

Farm Home Background of Boys
Enrolled in Vocational Agriculture Classes

Farm Home Background	Number of Cases	Per Cent
Boys living on the farm	51	37.7
Boys who do not live on a farm but can arrange for an adequate supervised farming program	21	15.6
All high school boys	63	46.7
Total	135	100.0

A review of the above table reveals that no selection is practiced in the majority of the cases. It is evident that this practice definitely handicaps the vocational agriculture program. The very foundation of the vocational agriculture program depends upon the extent to which the students can engage in a progressive supervised farming program. The indications are that many of our teachers are limited in planning a farm mechanics training program based on actual farming programs.

It has been observed that many schools pass many of the routine repair jobs to the farm mechanics shop. Many of these jobs make excellent practice work in shop classes. This is true if the same type of job is not required time after time and if it is planned into the teaching program.

TABLE XLVIII

Number of Departments
Performing General School Repair Jobs

Item	Number of Cases	Per Cent
Do repair jobs for the school	90	66.6
Do not do repair jobs for the school	45	33.4
Total	135	100.0

It is found that the majority of our vocational agriculture departments perform repair jobs for the school. It is evident that the teacher involved must exercise careful planning to include these jobs on an instructional basis.

The principals were also asked to state whether the teacher of agriculture approves these jobs from the standpoint of teaching a new skill.

TABLE XLIX

Number of Teachers Approving School
Repair Jobs as Method of Teaching Skills

Item	Number of Cases	Per Cent
Approve the jobs from the standpoint of teaching a new skill	88	80.0
Do not approve the job	21	20.0
Total	109	100.0

The indications are that the majority of the teachers approve school repair jobs from the standpoint of teaching a new skill. The writer wishes to state that, if many such jobs are accepted, a serious impairment of actual farm mechanics activities will exist. Most of the school repair jobs are not repair jobs that would normally occur on the farm.

Many teachers of agriculture accept shop jobs from farmers when they furnish the necessary materials. Sometimes the agriculture department supplies the materials and the farmers reimburse the department. This type of work is called custom work. The principals were requested to state their opinions of this practice. Their replies are recorded below:

TABLE XL

Principals' Opinions of Custom Work for Farmers Performed by Farm Mechanics Classes

Opinion	Number of Cases	Per Cent
Excellent	17	16.5
Good	35	34.0
Fair	38	36.9
Poor	13	12.6
Total	103	100.0

This table discloses that the principals are divided in their opinion of custom work. The indications are that the majority of the principals believe such work to be an acceptable practice.

The principals were also asked to list their opinions of the amount of custom work performed by the vocational agriculture department.

TABLE L

Principals' Opinions as to the Amount of Custom Work Performed by Vocational Agriculture Departments

Opinion	Number of Cases	Per Cent
Enough	58	60.0
Too much	0	00.0
Not enough	39	40.0
Total	97	100.0

In the main the principals agree that their agriculture department takes in enough custom work. It must be stated that the function of the vocational agriculture department is to instruct, not take in service. It is the argument of the writer that the adult farmers needing these projects could be taught farm mechanics in an adult farmer class.

The principal of the school should be familiar with the aims and purposes of each phase of the total school program. The writer considers next the question of the principal being familiar with the aims and purposes of the farm mechanics phase of the vocational agriculture program.

TABLE LI

Principals Familiar With the Purposes of the Farm Mechanics Phase of the Vocational Agriculture Program

Item	Number of Cases	Per Cent
Principals who are familiar with the purpose of the farm mechanics phase of the vocational agriculture program	115	85.2
Principals who are not familiar with the purpose of the farm mechanics phase of the vocational agriculture program	20	14.8
Total	135	100.0

It appears that the majority of the principals are familiar with the aims and purposes of the farm mechanics phase of the vocational agriculture program.

There are many who contend that the primary function of the principal should be the improvement of instruction. If the principal is to fulfill this requirement, he should be a party in the conference held after the visit of special supervisors. This conference should be planned at a time not to conflict with other duties of the principal. Table LII discloses these data.

TABLE LII

Principals Who Sit in on the Conference During Visits of State or Local Supervisors to the Vocational Agriculture Department

Item	Number of Cases	Per Cent
Always	48	35.5
Usually	59	43.7
Sometimes	21	15.6
Do not	7	05.2
Total	135	100.0

Data reveal that the majority of the principals always or usually attend the conferences following the visits of state and local supervisors of instruction.

The principal of each high school was requested to list any criticism he might have of the farm mechanics program conducted in his school.

TABLE LIII

Criticisms of Principals' of Farm Mechanics Programs

Observation	Number of Cases	Per Cent of Total
Agriculture teacher needs more training in farm mechanics	58	43.0
Inadequate facilities	59	43.7
Poor shop discipline	10	07.4
Inadequate supplies	50	37.0
Lack of time in teaching schedule	24	18.0
Inadequate planning	21	15.6
Program not planned to meet the needs	10	07.4
Poor shop organization and management	11	08.0
Classes too large	9	06.7
Farm mechanics program formulated around what the boys want to construct	19	14.0
Too many projects not related to agriculture	10	07.4
Too much custom work for farmers in the community	4	03.0
Poor housekeeping in shop	15	11.0

It is found that inadequate training, facilities and supplies lead the list of criticisms by principals. Lack of time in the teaching schedule, inadequate planning, farm mechanics program formulated around what the boys want to construct and poor housekeeping follow in order.

The last item requested from the principals was to rate the farm mechanics phase of their vocational agriculture program from the standpoint of meeting the needs of the farming community.

TABLE LIV

Principals' Ratings of the Farm Mechanics Phase of the Vocational Agriculture Program

Rating	Number of Cases	Per Cent
Adequate and meeting the needs of the school and community	34	25.2
Meeting some of the needs	56	41.5
Would meet needs with some improvement	28	20.7
Inadequate	17	12.6
Total	135	100.0

The above points out that only 34 principals consider their farm mechanics program adequate. These data present to all concerned with vocational education in agriculture a challenge in the improvement of a phase of instruction that is vitally needed in modern agriculture.

CHAPTER IV

SUMMARY AND CONCLUSIONS

SUMMARY

This study concerns itself with some factors affecting the teaching of farm mechanics as reflected by opinions, practices and training of teachers of vocational agriculture and the opinions, observations and practices of certain high school principals. There were 174 teachers and 157 principals who cooperated in this study.

Data in this study reveal:

1. That 88 or 50.8 per cent of the teachers have experience ranging from one to ten years

2. That 100 or 57.4 per cent of the teachers have been teaching in the present school from one to ten years

3. That 59 or 34 per cent of the departments of vocational agriculture have been established 16 to 20 years

4. That the enrollment in all-day classes ranged from less than 20 to 89 pupils

5. That the enrollment in young farmer classes ranged from less than 20 to 30

6. That the enrollment in adult farmer classes ranged from less than ten to over 60

7. That 132 or 76 per cent of the schools cooperating in this study have farm mechanics shops

8. That approximately 25 per cent of the shops are not of adequate size for instruction to all-day, young and adult farmer classes

9. That 58.4 per cent of the shops are not adequately equipped to carry out all phases of farm mechanics needed in the community

10. That 66 per cent of the teachers prepare a written annual teaching plan in farm mechanics

11. That 114 or 86.4 per cent of the teachers divide their classes into work groups

12. That 58 or 44 per cent make farm mechanics surveys

13. That 46 or 35 per cent have their students keep an outline of completed farm jobs in a notebook

14. That 98 or 74 per cent center the farm mechanics teaching program around the supervised farming programs

15. That 104 or 60 per cent have an organized plan for tool issue

16. That 128 or 96 per cent have familiarized the local school administrators with the purposes of the farm mechanics phase

17. That 37 or 26 per cent submit a copy of the annual teaching plan to the superintendent, supervisor and principal

18. That 77 or 58.3 per cent use the principal and supervisor in planning the farm mechanics program

19. That 28 or 21.6 per cent of the teachers have worked out a long-time plan for the improvement of farm mechanics facilities with the local school administrators

20. That all of the specified areas of farm mechanics are being taught in Louisiana. Farm power and machinery and soil and water management are weak.

21. That the teachers spend one-fourth to one-third of the scheduled class time in farm mechanics instruction

22. That Plan "D" is commonly employed in the operation of departments of vocational agriculture

23. That 93.1 per cent of the total number of teachers participating in this study were reared on a farm and 95.4 per cent of those conducting farm mechanics programs were reared on a farm

24. That general agriculture was practiced on the majority of the teachers' home farms

25. That horse drawn equipment was used on the majority of the teachers' home farms

26. That 53.6 per cent of the total number of teachers and 76 per cent of those conducting farm mechanics programs, took from one to four years of vocational agriculture in high school

27. That woodworking, tool conditioning, general farm carpentry, and soil and water management were the principle areas of farm mechanics that present teachers of agriculture received high school training in

28. That farm shop and land drainage and terracing are the areas of farm mechanics in which the majority of the teachers were trained at the undergraduate level

29. That the majority of teachers seeking higher degrees did not select advanced farm mechanics subjects

30. That all areas of farm mechanics were taught to all-day students, young and adult farmers last year, but data indicate a lack of planning and organization in the teaching programs

31. That the principals in this study have a length of service ranging from one to over 35 years

32. That 60 or 38.2 per cent of the principals have served in the present school from one to five years

33. That 135 or 86 per cent of the schools represented by principals have farm mechanics shops

34. That 66 or 49 per cent of the shops were constructed during the present principal's tenure

35. That 85 or 63 per cent of the vocational agriculture departments represented by principals participating in this study are housed in vocational agriculture buildings

36. That 77 or 57 per cent of the principals receive a written annual teaching plan in farm mechanics from teachers of vocational agriculture

37. That 72 or 53.3 per cent of the principals have long-time plans for the improvement of farm mechanics facilities

38. That the majority of the principals hold meetings with the teacher of vocational agriculture as the need arises

39. That principals are divided in their opinion of the value of advisory councils in the work of the vocational agriculture departments

40. That teachers of agriculture are assigned many special school duties

41. That general science, social studies and mathematics are extra subjects usually assigned to the teacher of agriculture

42. That selection of vocational agriculture students is not a general practice

43. That 115 or 85.2 per cent of the principals are familiar with the purpose of the farm mechanics phase of the vocational agriculture program

44. That the principals do not attend all of the supervisory conferences concerning the vocational agriculture department

45. That lack of farm mechanics training, inadequate facilities, inadequate supplies, lack of time in the schedule, and inadequate planning were the criticisms most frequently mentioned by the principals of the farm mechanics program.

46. That only 34 or 25.2 per cent of the principals indicated that their farm mechanics program was meeting the needs of the school and community.

CONCLUSIONS

The following conclusions are drawn from this study of some factors affecting the teaching of farm mechanics in Louisiana with some assurance that they are valid and will be of some benefit to the administrators and teachers of vocational agriculture.

1. There is sufficient evidence in this study to indicate that the length of time that a teacher had been at one school did not affect the quality of his instructional program in farm mechanics.

> The length of tenure of a teacher at the same school should affect the quality of his instructional program in farm mechanics. Before a teacher can put into operation a sound and functional program in farm mechanics he should be thoroughly familiar with the farming situation, the type of farm equipment used and the methods of operation, care and maintenance practiced by the farmers. It requires several years to layout, equip and organize a shop so that effective teaching can be accomplished even though the shop was established prior to the teacher's employment at this school.

2. Evidence in this investigation reveals that in the majority of the cases the enrollments in all-day, young and adult farmer classes are of a size that enables the teacher to keep shop classes within the number usually recommended.

Farm mechanics classes should be of a size that will enable the teachers to supervise adequately the work being done. The enrollment in a shop class should never crowd the work area or be in excess of the shop equipment available. It is generally agreed that for farm mechanics instruction to be most effective, the class should consist of from ten to fifteen and most certainly never over twenty.

3. Data indicate that in many cases the size and equipment of the farm mechanics shops in Louisiana prevent the teaching of all areas of farm mechanics needed in the school community.

It is the responsibility of the local school administrators to see that the proper facilities for the conduct of the various educational programs are supplied so that these programs can operate at the superior-merit level. Due to the nature of farm mechanics, adequate space is required and the special tools and equipment for the various jobs are essential. It is also the responsibility of the teacher of agriculture to keep the local school administrators aware of the needs of the farm mechanics program.

4. A review of data indicate that most teacher of vocational agriculture have familiarized the local administrators with the aims and purposes of the farm mechanics phase of the vocational agriculture program.

The local school administrators should be familiarized with the aims and purposes of the farm mechanics phase of the vocational agriculture program. The teacher cannot carry out the most effective program without the aid of the local school administrators. If these administrators are to give the teacher the assistance that is necessary for a successful program, they must be familiarized with, understand and support the program.

5. This study reveals that very few of the teachers and local school administrators have a long-time plan for the improvement of farm mechanics facilities.

The mechanical picture of farming changes very rapidly. A shop that is adequately equipped today may be lacking in necessary facilities for the program next year. It must also be remembered that tools and equipment must be replaced when worn out or broken. A long-time plan for the improvement of facilities is vitally necessary to a successful farm mechanics program.

6. Evidence also indicates that the schedule followed by the majority of the schools may be a deterrent to the development of a functional farm mechanics program.

> The employment of the sixty minute period for farm mechanics instruction does not provide adequate time to enable the teacher to issue tools and materials, demonstrate jobs, supervise individual work and clean the shop. It is urgent that local school administrators become cognizant of these facts and make schedule provisions that will not impair the development of this phase of education.

7. This study further indicates that the teachers of agriculture lack sufficient training for teaching farm power and machinery and electricity.

> The teachers of vocational agriculture should be trained in all areas of farm mechanics so that they will be capable and confident in planning and putting into operation a program of farm mechanics that will meet the mechanical needs of present and prospective farmers. The teacher must feel confident that his training and experience puts him in a position to be the agricultural leader, advisor, director and instructor for all needed phases of agricultural mechanics in the school community.

8. With the exception of the farm shop and carpentry phases in the total mechanical program, there is an obvious lack of teacher planning and instructional organization.

> The farm mechanics program should be planned around the supervised farming activities and the mechanical needs of the farmers. The present and prospective farmers should be trained in the knowledge, abilities, ideals and appreciations that they need for solving the mechanical problems with which the progressive farmers of today has to deal.

9. This study further indicates that teachers of agriculture are required to perform many other special school duties and also many of them are assigned to teach subjects other than agriculture.

> Farm mechanics is a highly specialized phase of technical agriculture and as such requires a considerable amount of planning and preparation on the part of the teacher. It is impossible for the teacher of agriculture to plan properly and prepare for instruction, keep an adequate supply of materials and keep the shop in readiness for classes if his entire day is filled to capacity with special and instructional duties other than

agriculture. Local school administrators are urged to determine carefully the extra activities assigned to these teachers so that they will have sufficient time to devote to their specific agricultural duties.

10. It is apparent that many non-farm mechanics activities are included in the shop programs of a number of teachers of vocational agriculture.

While it may be true that non-farm mechanics activities included in programs in this state are good shop training jobs, it is by no means true that they are good farm mechanics training activities. The farm mechanics field is very broad and, with the best training possible, a boy will leave high school with only an introduction to the various areas necessary for successful farming today. All teachers of agriculture are urged to evaluate their present programs from the standpoint of meeting the mechanical needs of present and prospective farmers.

11. It was revealed that in 46.7 per cent of the cases, all boys in high school must take vocational agriculture. This practice is not in accord with the basic principles of vocational education. Vocational education in agriculture should be for those who want it, need it and can profit by it.

Farm mechanics instruction is an integral part of each farm enterprise. Each of such farm enterprises should be analyzed and the mechanical activities necessary for the successful completion of the enterprise be included in the farm mechanics teaching plan. If the pupils do not have the facilities to carry out a progressive supervised farming program the exercise of purposeful farm mechanics jobs is limited and will probably result in the including of non-farm mechanics jobs in the instructional programs. The local school administrators and teachers of vocational agriculture are urged to enroll only those who have or can make arrangements for facilities to carry out a sound supervised farming program.

12. This study also indicates that most teachers in Louisiana allot one-fourth to one-third of the total class time to farm mechanics.

The amount of time that should be devoted to farm mechanics will depend on the type of farming practiced in the community, the degree of mechanization, the type of farm equipment used and the prior training of the farmers. The time factor should be carefully analyzed by the teacher and time alloted to farm mechanics in keeping with the needs of the community. In no case should an excess of time be spent in farm mechanics at the expense of another much needed area of technical agriculture.

CHAPTER V

RECOMMENDATIONS

Recommendations for farm mechanics on a state-wide basis will have to be general in nature. It is realized that the problem of developing the farm mechanics program for any given school is a separate and distinct problem. In keeping with the above facts, the following recommendations are made to the local school administrators and the teachers of vocational agriculture for the further development of the farm mechanics phase of their education program:

1. The teacher should secure all the information possible about the farm mechanics situation in the community where he is teaching. This may be done by making periodical farm mechanics surveys of the farms in the community. These surveys may be a part of regular farm surveys prepared and made by the teacher to give him an overall view of the farming conditions and needs in the community.

2. To have an effective farm mechanics program the school must have facilities for such a program. It is the responsibility of the local school administrators to see that the proper facilities for the conduct of the various educational programs are supplied. The teacher of agriculture should confer regularly with the school administrators concerning changes in the farm mechanics phase and needed facilities.

3. The farm mechanics instructional program should be planned around the supervised farming programs and the needs of the farmers. Each farm enterprise should be analyzed to determine the farm mechanics phases necessary for the most profitable completion of the enterprises. In addition to the enterprise mechanics a basic skills program in the farm shop area should be formulated. These skills should be the foundation for the other four areas of farm mechanics.

4. The undergraduate and graduate curricula of the teacher-training institutions should be evaluated to determine if the farm mechanics training needs of present and prospective teachers of vocational agriculture are being met. The teacher of agriculture should be trained in all areas of farm mechanics so that he will feel capable and confident in assuming the role of leader, advisor, and instructor in all phases of mechanical farming.

5. An intensive in-service teacher-training program in farm mechanics should be established. This program should be a joint effort by the teacher-training institutions, the State Department of Education and agricultural commercial agencies throughout the State. These in-service training classes should be planned on a district basis and the teachers called in for the planning sessions so that the specific areas where training is needed will be included in the program. The aid and support of the local school administrators should be secured as well as authorizations for the teachers to attend the classes. By all means these classes should be so planned that the normal operation of the school will not be upset.

Further recommendations may be made in relation to other studies that should be made either as a companion study or studies related to this one. From the writer's experience in this field, with this study and others, the following recommendations are presented:

1. That pilot studies be made concerning farm mechanics as practiced on a selected number of farms in the State of Louisiana. The results of these studies to be compared to the present study, especially the section dealing with the instructional program in farm mechanics presented by the teachers of agriculture.

2. That a study be made of the existing equipment of farm mechanics shops. This would present a picture of the farm mechanics facilities and serve a very useful purpose to the State Department of Education, teacher-training institutions, local school administrators and teachers of agriculture.

3. That a study be made dealing with home farm shops on Louisiana farms. This should concern itself with the number of farm shops in Louisiana, the size of the shop, the equipment and the recommendations of the farmers who operate home farm shops as to the size of the shop, the equipment and the location.

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APPENDIX

A Questionnaire

General Information

1. How many years have you taught vocational agriculture?_____

2. What type of degree do you hold? (Example: B. S. in Vocational Agriculture Education, 1940)

   B. S. _____ 19_____
   M. S. _____ 19_____
   Others _____ 19_____

3. How many years have you taught in the school in which you are now teaching?_____

4. How many years has there been a department of vocational agriculture in your school?_____

5. How many students are there enrolled in your vocational agriculture classes? All-Day_____, Young Farmers_____Adult Farmers_____

6. Does your vocational agriculture department have a farm mechanics shop? Yes_____ No_____

7. If answer to the above question is yes:
   (a) Is the shop of adequate size to accommodate
      1. All-day classes? Yes_____ No_____
      2. Young farmer classes? Yes_____ No_____
      3. Adult farmer classes? Yes_____ No_____

   (b) Is the farm mechanics shop equipped to carry out all phases of farm mechanics needed in your community? Yes_____ No_____

   (c) Do you have a written annual teaching plan for farm mechanics instruction? Yes_____ No_____

   (d) Do you have your all-day classes divided into work groups? Yes_____ No_____

   (e) Do you have students in all-day, young farmer, and adult farmer classes make a farm mechanics survey of the home farm to assist you in formulating your annual teaching plan? Yes_____ No_____

   (f) Do you have your students keep an outline of completed farm mechanics jobs in a farm mechanics notebook? Yes_____ No_____

   (g) Do you plan your annual farm mechanics teaching plan around the boys' supervised farming programs? Yes_____ No_____

(h) Do you have an organized plan for checking tools in and out and cleanup? Yes_____ No_____

(i) Are farm mechanics instructional materials furnished by the local school board_____, FFA Chapter fund_____, or by the students_____?

(j) Have the local school administrators been familiarized with the purpose of the farm mechanics phase of the vocational agriculture program? Yes_____ No_____

(k) Have you submitted a copy of your annual farm mechanics teaching plan to your superintendent, supervisor and principal? Yes_____ No_____

(l) Does your principal and supervisor assist you in planning and carrying out your farm mechanics program? Yes_____ No_____

(m) Have the local school administrators worked out a long-time plan with you for the improvement of farm mechanics facilities? Yes_____ No_____

(n) Does your farm mechanics program include training in the following areas:
1. Farm shop _____
2. Farm power and machinery_____
3. Farm electricity_____
4. Soil and water conservation_____
5. Farm carpentry and buildings_____

(o) How much school time do you use in farm mechanics instruction? (Check one of the following:)
1. 1/4 of the class time_____
2. 1/3 of the class time_____
3. 1/2 of the class time_____

(p) Check the schedule plan you are following:
A_____, B_____, C_____ or D_____

Information Concerning Training in Farm Mechanics

1. Were you reared on a farm? Yes_____ No_____

2. If answer to number one is Yes
(a) What type of farming was practiced? _____

(b) What type of farm equipment was in use on the farm?
1. Tractor and tractor equipment_____
2. Horse drawn equipment_____

(c) Did you learn to operate tractor and tractor drawn equipment on the home farm? Yes_____ No_____

(d) Did you own a car on which you did the service and repair? Yes_____ No_____

(e) Did you service equipment on the home farm? Yes_____ No_____

(f) Was there a systematic plan for servicing equipment in operation on the home farm? Yes_____ No_____

(g) Did you receive some training in the following areas of farm mechanics on the home farm?
1. Farm shop_____
2. Farm power and machinery_____
3. Farm electrification_____
4. Soil and water conservation_____
5. Farm carpentry and buildings_____

3. Did you take vocational agriculture in high school? One year_____, Two years_____, Three years_____, Four years_____, None_____. From 19_____ to 19_____

4. If answer to above question is Yes, check the following as they applied to your farm mechanics training in that school:
(a) Did the vocational agriculture department have a farm mechanics shop? Yes_____ No_____

(b) Was this shop equipped so that training could be given in the following areas of farm mechanics?
1. Farm shop_____
2. Farm carpentry_____
3. Farm power and machinery_____
4. Farm electricity_____
5. Soil and water conservation_____

(c) How much time was spent in farm mechanics instruction?
1. 1/4 of the class time_____
2. 1/3 of the class time_____
3. 1/2 of the class time_____
4. More_____

(d) Did you receive high school farm mechanics training in
1. Farm shop
   a. Woodworking_____
   b. Tool conditioning_____
   c. Farm plumbing_____
   d. Soldering and sheet metal_____
   e. Hot and cold metal work_____
   f. Concrete_____
   g. Welding
      1. Electric Arc_____
      2. Acetyelene_____

2. Farm power and machinery
   a. Tractor operation_____
   b. Tractor maintenance and minor repair_____
   c. Tractor selection_____
   d. Farm equipment maintenance and minor repair_____
   e. Farm equipment operation_____
   f. Farm equipment selection_____
   g. Cost of using farm tractor and equipment_____

3. Farm carpentry and buildings
   a. Proper care and use of hand tools_____
   b. Draw simple plans for projects_____
   c. Read simple blue prints_____
   d. Figure bill of materials_____
   e. Layout and cut common rafters_____
   f. Stake out a foundation_____
   g. Construction of small structures_____
   h. Building maintenance_____

4. Farm electricity
   a. Understanding electrical terms_____
   b. How to select wiring materials for a given use_____
   c. How to run a parallel circuit_____
   d. How to install a wall receptable_____
   e. How to install a light switch_____
   f. How to install a ceiling light_____
   g. How to plan an electrical system for the farmstead_____
   h. How to install a three-way switch_____
   i. Fuzes and their function_____
   j. Use and care of electrical motors_____
   k. Installing electric fences_____

5. Soil and water conservation
   a. How to layout, run, construct and maintain terraces_____
   b. How to run contour lines_____
   c. How to layout a field for drainage_____
   d. Different types of drainage systems_____
   e. Locate drainage ditches for a field_____
   f. Lay drain tile_____
   g. How to layout a field for sprinkler irrigation_____

(e) In your opinion did the farm mechanics training you received in high school prove beneficial to you in setting up and conducting your own farm mechanics program? Yes_____ No_____

5. What college or university did you attend?_____

6. What year did you graduate?_____

7. How many semester hours of farm mechanics (agricultural engineering) did you have in your pre-service training?_____

8. If you took courses in the following, please check:
   (a) Farm shop mechanics_____
   (b) Methods in farm shop mechanics_____
   (c) Land drainage and terracing_____
   (d) Farm tractors_____
   (e) Farm machinery management_____
   (f) Please list other undergraduate courses in farm mechanics you have taken.

   _____ _____
   _____ _____

9. Have you taken any graduate work in farm mechanics? Please list courses.

   _____

   _____

   _____

   _____

   _____

10. Have you attended the in-service training workshops provided by the State Department of Education, Louisiana State University, and Commercial Companies in your area? All_____, Some_____, None_____

11. Check your opinion of the in-service training classes as conducted. Excellent_____, Good_____, Fair_____ or Poor_____

12. Have you used company representatives to assist you in teaching some of the technical phases of farm mechanics? Yes_____ No_____

13. Have you made appointments with technical personnel of colleges, university, and commercial companies for the specific purpose of learning a new skill? Yes_____ No_____

14. On the form below please list the farm mechanics jobs you have taught to all-day classes so far this year and those you expect to teach the remainder of the year.

FARM MECHANICS JOB	9th	10th	11th	12th

Your cooperation in filling out this form is urgently requested. This material is very vital to the success of this study.

15. Do you have in operation a planned program in farm mechanics for young and adult farmers? Yes_____ No_____
    (a) If answer to the above is Yes please list the farm mechanics jobs taught to young and adult farmers on the form below. Your cooperation in filling out this form is urgently requested. This information is very valuable to the success of this study.

FARM MECHANICS JOBS	YOUNG FARMERS	ADULT FARMERS

A Questionnaire

1. How long have you served as principal of a high school?_____years

2. Have you served as principal of a high school in a State other than Louisiana? _____years. If so, how many years was vocational agriculture included in the curriculum? _____years

3. How many years have you served as principal of this school? _____years

4. How many years has there been a vocational agriculture department in your school? _____years

5. Does your vocational agriculture department have a farm mechanics shop? Yes_____ No_____

6. How many years have you had these shop facilities? _____years

7. Was this shop constructed during your tenure as principal of this school? Yes_____ No_____

8. Check any of the following that apply to your vocational agriculture facilities:
   (a) Classroom and shop adjoining and located in the high school building_____
   (b) Classroom and shop separate and located in the high school building_____
   (c) Classroom and shop housed together in a vocational agriculture building_____
   (d) Classroom located in high school building and shop located in a separate building_____

9. Do you consider the present farm mechanics shop of adequate size and properly equipped to meet the farm mechanics need for instruction in: (check one or more items)
   (a) All-day classes_____
   (b) Young farmer classes_____
   (c) Adult farmer classes_____

10. Is it a practice in the farm mechanics classes in your school to include instruction in the following: (check one or more that apply)
   (a) Furniture construction_____
   (b) Model airplanes_____
   (c) Fancy leather work_____
   (d) Bird houses_____
   (e) Repair jobs on student's own automobile_____
   (f) Lamps_____
   (g) Others (specify)_____
   _____
   _____

11. Does the teacher of agriculture submit to you a written annual teaching plan that includes farm mechanics? Yes_____ No_____

12. Have you and the teacher of agriculture a long-time plan for improving the farm mechanics facilities and program? Yes_____ No_____

13. Do you meet regularly with your vocational agriculture teacher to discuss his program and the problems he encounters? (check one or more that apply)
(a) Once a month_____
(b) Quarterly_____
(c) Semi Annually_____
(d) Annually_____
(e) Do not meet with him_____
(f) Other (specify)_____

14. Does your teacher of agriculture have an advisory council? Yes_____ No_____ Is it functioning? Yes_____ No_____ Number of meetings per year_____. Number of members in the council_____. Check your opinion of the value of an advisory council in a program of vocational agriculture.
(a) Excellent_____
(b) Good_____
(c) Fair_____
(d) Poor_____
(e) No value_____

15. Check the school activities listed below that your teacher of agriculture performs and list the approximate number of periods per week for each activity:

Activity	No. Periods Per Week
Physical education	
School transportation	
Debate team	
School paper	
School movies	
School contests	
School elections	
School fairs and exhibits	
Coaching athletics	
Others (list)	

1. _____ 2. _____

16. Does your teacher of agriculture teach any of the following subjects? (check one or more items)
(a) General science_____
(b) English_____
(c) Civics_____
(d) Biology_____
(e) Chemistry_____
(f) Mathematics_____
(g) History_____
(h) Geography_____

(i) Others (list)_____
_____
_____

17. Which of the following plans for securing work materials and supplies do you favor? (check one or more items)
(a) Furnished by the local school board_____
(b) Furnished by the school fund_____
(c) Furnished by students_____
(d) Purchased by the FFA Chapter and sold to individual students_____

18. From your observations check any of the following that apply to your farm mechanics program: (check one or more items)
(a) Agriculture teacher needs more training in farm mechanics_____
(b) Inadequate facilities_____
(c) Poor shop discipline_____
(d) Inadequate supplies_____
(e) Lack of time in teaching schedule_____
(f) Inadequate planning_____
(g) Program not planned to meet the needs_____
(h) Poor shop organization and management_____
(i) Classes too large_____
(j) Farm mechanics program formulated around what the students want to construct_____
(k) Too many projects that are not related to agriculture training_____
(l) Too much custom work for farmers in the community_____
(m) Poor housekeeping in shop_____
(n) Others (list)_____
_____ _____
_____ _____

19. Is the enrollment in your vocational agriculture made up of: (check one or as many as describe your enrollment)
(a) Boys living on a farm_____
(b) Boys who do not live on a farm but can arrange for a supervised farming program_____
(c) Any boy who wants to take vocational agriculture_____

20. Does the farm mechanics classes do many repair projects around the school, such as, repairing broken window panes, repairing desk, etc. Yes_____ No_____

21. Does the agriculture teacher approve these projects from the standpoint of teaching a new skill? Yes_____ No_____

22. Does your farm mechanics shop construct projects for farmers in the community with the farmers furnishing the materials? Yes_____ No_____ In your opinion is this practice carried on:
(a) Enough_____
(b) Too much_____
(c) Not enough_____

Do you consider this practice:
(a) Excellent_____
(b) Fair_____
(c) Good_____
(d) Poor_____

23. Are you familiar with the purposes of the farm mechanics phase of the vocational agriculture program? Yes_____ No_____

24. When the state or local supervisor visits your agriculture department, do you sit in on the conference during the visit?
(a) Always_____
(b) Usually_____
(c) Sometime_____
(d) Do not_____

25. Do you feel the farm mechanics phase of your vocational agriculture program is: (check one item)
(a) Adequate and meeting the needs of the school community_____
(b) Meeting some of the needs_____
(c) Would meet the needs with some improvement_____
(d) Inadequate_____

26. Name of school_____

27. Comments: _____

_____

_____

_____

AUTOBIOGRAPHY

Charlie Monroe Curtis was born at Gandy, Louisiana, November 27, 1917. He received his elementary and high school training at Hornbeck High School, Vernon Parish, Louisiana.

In the fall of 1936, he entered Louisiana State University and completed requirements for a Bachelor of Science Degree in Vocational Agricultural Education in June, 1940.

He was employed as vocational agriculture teacher at Leesville High School from July 1, 1940, until June 30, 1941. He resigned this position to accept appointment as vocational agriculture teacher at Anacoco High School, Anacoco, Louisiana, from where he was inducted into the Armed Forces of the United States of America. He served his country forty-six months.

Upon his discharge from the Army on December 17, 1945, he resumed the position as teacher of vocational agriculture at the Anacoco High School, Anacoco, Louisiana. He continued in this capacity until September 1, 1949, when he resigned to accept the position of farm shop instructor in the Agricultural Engineering Department at Louisiana State University. He resigned this position in June, 1951, to accept his present position as Farm Mechanics Specialist in the Louisiana State Department of Education.

He received the Master of Science degree in Agricultural Education from Louisiana State University in August, 1952. In September of the same year he began work toward a Doctor of Philosophy degree in Agricultural Education and is a candidate for this degree at the present time.

He is married to Leola Fish Curtis. He has two children, Thomas David, age ten years and Jo Ann, age seven years.

EXAMINATION AND THESIS REPORT

Candidate: Curtis, Charlie M.

Major Field: Vocational Agricultural Education

Title of Thesis: Some Factors Affecting the Teaching of Farm Mechanics in Louisiana

Approved:

M C Gaar
Major Professor and Chairman

Richard J. Russell
Dean of the Graduate School

EXAMINING COMMITTEE:

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Date of Examination:

5/8/58